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Plate 40 wanting

A
GENERAL SYSTEM
OF
SURGERY,
IN THREE PARTS.

CONTAINING THE
DOCTRINE and MANAGEMENT

- I. Of WOUNDS, FRACTURES, LUXATIONS, TUMORS,
and ULCERS, of all Kinds.
- II. Of the several OPERATIONS performed on all PARTS
of the BODY.
- III. Of the several BANDAGES applied in all OPERATIONS
and DISORDERS.

The Whole illustrated with Forty COPPER-PLATES, exhibiting all the
OPERATIONS, INSTRUMENTS, BANDAGES, and IMPROVEMENTS,
according to the Modern and most approved Practice.

To which is prefixed,

An INTRODUCTION,

Concerning the *Nature, Origin, Progress, and Improvements* of SURGERY;
With such other PRELIMINARIES as are necessary to be known by the
YOUNGER SURGEONS.

Being a WORK of THIRTY YEARS Experience.

By DR. *LAURENCE HEISTER*,

Professor of *Physic* and *Surgery* in the University of HELMSTADT,
Fellow of the Royal Society, LONDON, and of the Royal Academy at PARIS, &c.

Translated from the AUTHOR's last Edition, greatly improved.

THE SEVENTH EDITION.

L O N D O N,

Printed for J. CLARKE, J. WHISTON and B. WHITE,
L. DAVIS and C. REYMERS, R. BALDWIN,
W. JOHNSTON, and H. WOODFALL.
MDCCLXIII.

GENERAL SYSTEM

OF

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III. OF THE SEVERAL BANDAGES APPLIED IN ALL OPERATIONS AND DISORDERS.

The Whole illustrated with Forty Copper-Plates, exhibiting all the Operations, Instruments, Bandages, and Improvements according to the Modern and most approved Practice.

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Concerning the Nature, Origin, Progress, and Treatment of the Venereal Disease, and the Manner in which it is to be cured, by the most effectual and safe Methods.

Being a Work of THIRTY YEARS EXPERIENCE.

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Formerly of the Royal Academy of Medicine, and of the Royal Swedish Army.

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T H E

EDITOR'S PREFACE

to the SIXTH EDITION.

THIS most excellent and elaborate Work, is so well known in the learned World, and has every where met with so favourable a Reception, that, to detain the Reader at present with any Encomiums on this Subject, would be vain and superfluous. But, as the judicious Author (who has not only his own Credit, and the Dignity of his Profession, but, what is infinitely more noble, the public Utility ever at Heart) has greatly improved and enlarged his Undertaking in succeeding Editions; the Proprietors of this Translation have, therefore, thought it their Duty to give a fresh Impression of it, enriched with all those useful and valuable Improvements. These Additions are dispersed almost every where throughout the Work; but are most large and copious in the important Branches of Lithotomy and Midwifry.

We have likewise inserted in this Edition two additional Plates, engraved from those of the Author's. And, that nothing might be wanting to complete it, the whole Translation has been revised, with great Labour and Attention, and particularly with an Eye to the Accuracy of the Pointing, which greatly assists the Clearness and Perspicuity of a Work, especially to the young Beginner, not yet versed in the Subject.—Upon the whole, we flatter ourselves, that we here offer to the Public, the most useful Work of its Kind now extant, thus carefully revised, and amply improved; which, on its first Appearance, not only led the Pupil through each Branch of the Practice, but was confessed, by the experienced and judicious Practitioner, to be a most complete, distinct, and comprehensive System of the whole Art of Surgery.

Since Dr. HEISTER published his System of Surgery, he has obliged the World with a large Collection of Cases in the several Branches of Surgery and Midwifry, which he printed in the *German* Language. This useful Work has been translated into *English*, at the Recommendation of the learned and ingenious Dr. PETER SHAW, *Physician in Ordinary to his Majesty*, who has been pleased, in the Preface, to declare it, to be “a very useful Work, containing a genuine Account of large Business, and a good History, not only of Dr. HEISTER's extensive Practice, but of the Improvements made in the several Parts of Physick and Surgery, during his own Time; and abounds with Improvements and useful Discoveries in the Course of his extensive Practice, during several Campaigns, and in many popular Cities of Germany. His ingenious Mind shines through the whole, as he describes not only the Cases wherein he was successful, but those wherein he failed.” And upon perusing it, Dr. SHAW found it so excellent, that he recommended it to be translated, believing it would prove highly serviceable to the Public.

TRANSLATOR'S PREFACE.

THE Translation of the Book before us, which now appears in the World, will obviate a Complaint frequently made among the junior Surgeons, and Pupils of this Art in *England*, viz. that they are in Want of a general System, capable of instructing at large one that is a Learner in Surgery, for the Execution of all the Branches of his Profession; and this, till now, might indeed be affirmed with some Justice. It is true, the several Branches of Surgery have been tolerably well handled by various Authors, at different Times, and in separate Treatises: Some have confined themselves to Wounds, Fractures, Luxations, Tumors, and Ulcers, which make the Subject of the first Part of the present System; others have written professedly on the Operations, Instruments, and Bandages; or miscellaneous Observations appertaining to the Practice of Surgery; and others have given us short Introductions to the whole; but in no one Book, except the present, do we meet with all these Branches treated in that ample, easy, and intelligent Manner, which is necessary for the first Information of Beginners, or the occasional Consultation of the more advanced. We have, in this Work, not only the best and most modern Methods of Practice used by the principal Surgeons of the skillfullest *European* Nations, but also exact Figures of their several Instruments and Bandages, with the Methods of using or applying them in all surgical Cases whatever; the whole Doctrine of which is here explained in the minutest Circumstances; and brought down even to the lowest Capacities. In short, no Character of the Book can so well recommend it to the Reader as his own Perusal, and the Author's Preface following.

London, Oct. 1742.

THE

AUTHOR'S PREFACE.

AFTER having studied Physic with great Affiduity above four Years in our *German* Universities, my Affections, being strongest for *Anatomy* and *Surgery*, led me to the then celebrated Professors RUYSCH and RAW, at *Amsterdam*, in the Year 1706; whose anatomical and chirurgical Demonstrations I diligently attended for about the Space of a Year. During which Time I was also employed in frequent Dissections, and in trying chirurgical Operations upon dead Subjects; in the mean Time omitting no Opportunities of being present at the Performance of any considerable Operation by these Professors, or by the other eminent Surgeons of the same City, as VERDUIN, BORTEL, KOENERDING, &c. By which Means, joined with an attentive Reading of the best Writers, I acquired a considerable Knowledge in Surgery.

But being desirous of all Helps to render myself still more expert and successful in the Practice of this Art, there being at that Time a sharp War in *Flanders*, betwixt the *French* and *Dutch*, in the Summer following, viz. in the Year 1707, I went from *Holland* to the *Dutch* Camp in *Brabant*, that I might inspect and observe the Practice of the *English*, *Dutch*, and *German* Surgeons, who there attended. Thus, through many Dangers and Hardships, I spent this whole Summer in the Hospitals of the Camp, for the Sake of Improvement. But in Autumn I went from *Brabant* to *Leyden*, and spent the whole Winter in attending the Lectures of the then celebrated Professors in that University, BIDLOO, ALBINUS senior, and BOERHAAVE: And thus I continued till the Beginning of the Summer 1708. After which, having taken my Degree of *Doctor*, I returned again to the Camp, where I found large Opportunities of learning and improving myself in Surgery, from the Multitude wounded, &c. in the several bloody Fights, particularly at the Siege of *Lisle*, and the Battles of *Audinarde* and *Wynendale*. Upon the Approach of Winter again, I was determined to settle in the Practice of *Physic* and *Surgery* in *Holland*, at *Amsterdam*, partly from

from the Delight I had in the Country, and partly through the Sollicitations of the famous RUYSCH, who respected me as a Son. Here therefore I stayed the Winter, and Part of the ensuing Spring, teaching *Anatomy* and *Surgery* to Students and Gentlemen, as RAW had done before me, who was now rejected for his ill Conduct or Misbehaviour.

The following Summer, in 1709, I had still a strong Desire to follow the Camp, to become more and more perfect in the Practice of *Surgery*; and *Tournay* being at that Time invested by the confederate Army in *Flanders*, I was, by the Recommendations of my Friend RUYSCH, appointed Physician to the Camp-Hospital for the *Hollanders*. I had now an Opportunity of performing all the chirurgical Operations which offered in the Camps and adjacent Cities, which I generally executed with Success. After the taking of *Tournay*, the confederate Army marched to besiege *Mons*, near which Place the *French* Army was also assembled. That, however, did not prevent us from investing and taking the City; before which the numerous Army had such a bloody Battle, that the Wounded were brought in upon us in Crowds. Their Number continually increasing, from the uncommon Heat of the Combat, every Surgeon had now his Hands full of Business, and infinite Calls for the Practice of his Art: For the Wounded, on the Side of the *Hollanders* only, amounted to above Five thousand. I had here therefore an ample Occasion to extend the Bounds of my Practice, and was obliged to put on that Intrepidity of Mind, which CELSUS requires as an essential Qualification in a Surgeon; and for want of which, some, who are, in other respects, skillful Operators, do frequently miscarry.

After the Army had entered into their Winter-Quarters, and the wounded Men recovered, I returned again to *Amsterdam*, where I continued my *Anatomical* and *Chirurgical* Demonstrations this Winter as before. In the mean Time, I never refused my Assistance at the Operations of the other Surgeons there.

But in the Beginning of the Spring following, 1710, I was, beyond all Expectation, called by the Republic of *Noringberg* to teach *Anatomy* and *Surgery*, as public PROFESSOR in the University of *Altorf*. Being therefore unwilling to neglect this honourable Invitation, having obtained

Leave from the Republic, I first made a Tour into *Great Britain*, where I was, from Spring to Autumn, collecting every thing new in the several Branches of *Physic*, and then, returning to *Norimberg* and *Aitorf*, I assumed my new *Professorship*.

In this Station I was under a Necessity of teaching publicly, among the other Parts of *Physic*, that most ancient, necessary, and useful Branch of it which we call *Surgery*, and which I had before taught privately during the two preceding Winters in *Holland*. But in doing this I was much perplexed for want of a convenient Manual, or compendious System of the Art, to assist and inform those Learners who attended my Lectures. To our want of such a *Compendium* I also attributed the general Ignorance and Insufficiency of the young Surgeons and Students in this Branch of *Physic*, which at that Time universally prevailed, through *Germany* especially. And from the same Cause the generality of our Surgeons, being unequal to the more difficult Operations, were content with being able to cure a slight Wound, open a Vein or Abscess, or at most to set a Fracture, and reduce a Luxation; leaving those Disorders and Operations, which require the greatest Skill, to the Management of daring Quacks and itinerant Operators, with which *Germany* at that Time swarmed.

If any one examines the best Books, such as the *Microtechnia* of VAN HOORN, the *Operations* of NUCKE, &c. which were at that Time consulted not only by our Surgeons, but also by our University-Professors, for teaching and learning the Art, it will readily appear how imperfect and insufficient they are to give a just Notion of any one Branch, much more of the whole System or Body of *Surgery*. Since they describe only a few of the Operations, and those too imperfectly; taking little or no Notice of the Doctrine and Treatment of Wounds, Fractures, Luxations, Tumors, and Ulcers, which make the most considerable Part of *Surgery*, and in which a Learner ought to be the most fully instructed. It is true, the Works of GUIDO CAULIACUS, AQUAPENDENS, PAREY, SCULTETUS, SOLINGEN, and some other Writers of the last Century, are very full and explicit in all or most of the Operations, and the five Kinds of Disorders beforementioned. But even in these we must not expect to find the many Improvements, Emendations, and Discoveries, made by the Moderns: And their Practice being mostly

mostly obsolete, they must consequently be allowed to be unfit for the Instruction of Learners. And it is an Objection to many of our Books in Surgery, of a more modern Date than the preceding, that they have been either compiled by Physicians, little conversant in chirurgical Dissections and Operations, as those of BARBET, VERDUC, BONTECK, DOLEY, BLANCARD, CHARRIERE, JUNCKEN, VAUGUION, LE CLERC, &c. in which many of the old Errors are continued, and not a few Things stated otherwise than will be found in Practice: Or else they have been restrained to but one or two Subjects only, as the Bones, Wounds, Tumors, Bandages, Operations, &c. besides their being written either in a rude, or a foreign Language, unknown to most of our Surgeons.

These were chiefly the Motives that first induced me to attempt the Composition of a chirurgical System, to be subservient to my own Lectures and Auditors: In doing which, I endeavoured to take in all the more useful Part both of our ancient and modern Writers in every Branch of Surgery; rejecting what appeared useless or obsolete, and comparing or correcting the whole conformably to my own Experience, and what I had seen in the Practice of the Art under many of the most skilful Surgeons and Physicians. And thus, from time to time, I endeavoured not only to correct and complete my Collections and Remarks, so as to take in every, even the minutest, Part of Surgery; but also I digested and disposed the whole in the Method which appeared to me the most natural, and the best adapted both for the Teacher and Learner.

These my first Labours I writ originally in *Latin*, in which Language they were also delivered to my Hearers, and permitted to be *transcribed* by them: But, considering the immense Fatigue that this Method of obtaining it gave the Student, with the great Loss of Time, which he might have otherwise employed to more Advantage, I was at length determined to *publish* it in *Latin*, in the Manner I had then composed it. Yet so great was the Ignorance of our *German* Surgeons, at that Time of Day, as well in the *Latin* Tongue as in their own Profession, that (my Work) being chiefly intended for them, I now judged it would be more useful to print the Book in our native *German*; for then both the learned, and ignorant of the *Latin*, might have the same Benefit of it. Accordingly I translated and sent it to the Press in the Year 1717, and in the Year following, 1718, it was published

as my *Surgery*, in 4to, at *Norimberg*, being illustrated with Copper-plates, exhibiting the best Instruments, &c. And from this time it is that we have had better or more expert Surgeons in *Germany* than before; many of which have since often declared to me, that they had drawn most of their Knowledge from my *Surgery*.

I intended, soon after, to have published the Book in *Latin*, for the Sake of *Foreigners*; but, in the Year ensuing, I received a most gracious Call to the public Professorship of *Anatomy* and *Surgery* in the *Julian* University of *Helmstadt*, from his *Britannic* Majesty, as Duke of *Brunswick* and *Lunenbourg*, under whom the University flourishes, and is liberally supported; so that what with the Care and Trouble of packing up, and removing my Goods, and the Fatigue of a long Journey, added to the Multitude of Business, and many Avocations consequent on my new Office, I have been obliged to delay the *Latin* Edition of my *Surgery* much longer than I ever thought or designed. However, the *Germany* Impression was sold off in a little Time, and the Bookseller urging for a second Edition, as there were several Improvements made lately in *Surgery*, particularly in *Lithotomy*, I therefore revised, corrected, and enlarged the Book, according to the later Discoveries, and my own recent Observations since made, so as to fit it then for a second, and some time after for a third Edition. But then this, with other Avocations in the mean time, prevented me from completing the Work in the learned Language, for the better Sort of Readers, so as to make it correspond to the Performances of foreign Authors, with which our *German* Surgeons were unacquainted.

But being at length solicited, as well by many learned Physicians and Surgeons of other Nations, as by my Bookseller at *Amsterdam*, to publish my *Surgery* in *Latin*, for the Advantage of *Foreigners*; and being unwilling to deny the Request, I have now, notwithstanding my academical and practical Business, made shift to print it in that Language, in many Places much enlarged and amended beyond any of the preceding Editions. And I hope it may be a Means of instructing young Surgeons in all the Branches of their Profession, according to the best modern Discoveries and Improvements which have been made in the Art. I have here endeavoured to present them with the whole Body of *Surgery* together, that Learners especially may not have their

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Knowledge

THE AUTHOR'S PREFACE.

Knowledge to seek in many different Books, by turning over some upon Wounds; others upon Fractures, Luxations, Tumors, or Ulcers; and others, again, upon Operations, Instruments or Bandages: All which, I think, are here sufficiently explained, not only for the Instruction of Learners, but all the Purposes of the more advanced.

Whether I have succeeded in this Task, must be left to the Determination of more prudent and impartial Judges; but this I may be allowed to say, that I have used my best Endeavours to promote the Glory of God, and the public Good, by these Labours of their

Devoted Servant,
Helmstadt,
 Jan. 10, 1739.
 THE AUTHOR.



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A GENERAL INTRODUCTION TO SURGERY.

Of the Nature, Constitution, Origin, Progress, Improvement, and Division of SURGERY ; and of other Things in general, which are principally necessary for STUDENTS in SURGERY to be acquainted with.

I. **T**HE principal end of *Physic* is to prevent or relieve the Disorders of the human Body. This the first Physicians endeavoured to effect by three means, either by *Food, Medicines, or the Application of the Hand*^a; or by all together, if the Case required it: which method, reason and experience teach us, is absolutely necessary at this time. And of these three branches of this salutary Profession, they called the first *Diet, or Dietical* (διαίτητική); the second *Pharmaceutical* (φαρμακδική); and the third *Chirurgical* (χειρουργική). For since the end of *Physic* could by no means be always obtained by *Diet* and *Medicine* alone, (though they are of very great service in preserving and restoring the Health of Mankind), but Manual Operation is also found sometimes to be absolutely necessary; it is plain therefore that this branch of *Physic*, which is called *Surgery*, is very necessary to mankind: more especially, as it appears, that by this means many grievous Disorders are relieved, as Wounds, Fractures, Luxations, and several others, where *Diet* and *Medicine* would afford very little, and sometimes no help at all. But that the excellence and necessity of this Art may appear more clearly, it may be necessary to observe, that other Arts only conduce to the conveniencies of life, but the Art of *Surgery* is frequently necessary for the preservation of life, and the continuance of health, the most valuable treasure we can be possessed of. This necessity appears more particularly in dangerous Wounds received in war, skirmishes, or sieges^b, where many brave men must necessarily perish

^a See CELSUS, Præf. Lib. I. pag. 3. Edit. Almelov. & Patav.

^b Of the Use and Excellency of Surgery, see VESALIUS, in præfat. Corp. Hum. fabric. GESNER, in Script. opt. Chir. CYPRIAN, Orat. encom. in Chirurg. SCHELLAMER, Præf. de Tumor. and KESSELRING, in Differt. de meth. Fourbertian, who treats very learnedly of the flourishing State of Surgery, and contends, that it is equal, if not preferable to, *Physic*, from the great Certainty and Rationality of its practice.

from loss of blood, and other causes, unless they were restored, and snatched as it were from the jaws of Death, by the skill of their Surgeons. And no doubt the better opinion the Soldiers conceive of their Surgeons, the more spirits have they for the combat, having good confidence that the Wounds they receive shall be properly treated, and their Lives preserved. And from hence, because Surgery is chiefly exercised in the treatment of Wounds, it is called by the *Germans* the cure for wounds (*Wund-Arzeney*) not as if Wounds were the sole objects of *Surgery*, but as it is of more particular and frequent service in cases of that kind.

Surgery,
What.

II. "*Surgery*, says *CELSUS*², is that branch of *Physic* which informs us how "to cure or prevent Disorders by the assistance of our Hands or Instruments, "or by the application of external Remedies," as disorders are frequently prevented by Bleeding, Scarifying, opening of Issues, and by Setons, &c. Since therefore *Surgery* is properly the Work of the Hand, it is very justly called by the *Greeks* *Χειρουργία*, from the two *Greek* words of that signification, *Χεῖρ* and *Εργον* from whence the person also skilled in this Work was called a *Chirurgion*. But He, whose office it is to cure disorders only by administering Medicines internally, and by prescribing rules for the regulation of the Diet, is at present in *Latin* called *Medicus*: though this is a modern distinction, and unknown to the Ancients, among whom both offices were performed by the same person, called *Ἱατρός*; as appears plainly by the writings of *HOMER*, *HIPPOCRATES*, *CELSUS*, and many others.

It may be
called a Sci-
ence and an
Art.

III. Some call *Surgery* a *Science*, others an *Art*: but, in my opinion, it will claim either appellation. For it may be called a *Science*, because the Student in *Surgery*, before he is skilled in the method of healing, must have acquired the Precepts or Foundation of what is to be done towards discovering and remedying disorders that are to be relieved by the Assistance of the Hand, from *Anatomy*, *Physics*, and *Mechanics*: for without this knowledge he would not only go very idly to work, but would do more harm than good to his Patients, and consequently to the Public. It also well deserves the name of an *Art*, when any one is so well versed in the Elements of this Art, that he is able to preserve the Body sound, as well as to relieve it when it is otherwise. Hence we very properly term those skilled in the *Art* of *Surgery*, who are expert in healing Wounds, replacing fractured and dislocated Bones, and understand the right methods of treating other Disorders which require the assistance of the Hand or Instruments. From hence, I imagine, arose the distinction which some have made between *theoretical* and *practical Surgery*. Thus *Surgery* was considered, when ranked under the first denomination, as a *Science*: as when a man has learnt and understands the Rules, and the Reasons upon which those Rules are grounded, which teach the best Methods of treating Disorders that call for the *Surgeon's* hand, and in what manner *Operations* (as they are vulgarly called) are to be performed; but never attempts the performance of any of these *Operations*, whether they are dividing, amputating, cauterising, or reducing Bones, or of any other kind. This *Science* we call *Medical Surgery*. And this branch of *Surgery*, at least, all *regular Physicians* ought to be well acquainted with; that they may be of service to the *Surgeons* and their *Patients*,

² Lib. I. Prefat. pag. 3. and Lib. VII. in the beginning of the Preface.

by being able to give prudent advice in disorders of this kind. *Surgery*, when it falls under the second denomination, and is termed *practical*, signifies the exercise of it, or the *Art* of performing Chirurgical Operations, of replacing, tying, cutting, extirpating, dividing, cauterising, &c. The *Practical Surgeon* is well instructed in the art of managing his Hands and Instruments dextrously in the performance of such Operations as the necessity of the case shall require. Much the greater part of the modern *Physicians* have been content with the knowledge of the former part of *Surgery*, leaving the execution of the latter, which is much to be lamented, to unskilful Quacks and ^a Montebanks. This happens partly because the Disorders that are curable by the prudent administration of Medicines internally, and a well-regulated Diet, which more immediately come under the province of the Physician, are so numerous, and withal so intricate, as to be a sufficient exercise for his whole Study; and partly because Cures which are to be performed by the Hand, especially those which are attended with danger or severity in the execution, require a singular fortitude and firmness of resolution; or, as the elegant CELSUS expresseth it ^b, A Mind intrepid, divested of Tenderness, and unmoved by the Shrieks of the suffering Patient: Which is to be met with in very few, though they may be perfectly well acquainted with every thing that ought to be done. But whosoever desires to be a perfect *Surgeon*, must be a thorough Master of his Profession under both heads, as a *Science* and as an *Art*: and in such a manner that the *theoretical* Part, or knowledge of the Elements, (in which *Anatomy* claims the first place) should precede the exercise of the Art. For if any one should be bold enough to proceed in the contrary method, and invert this rule, by undertaking to perform Operations, especially those of the more difficult kind, before he had made himself well acquainted with *Anatomy*, the nature of Diseases, and what is proper to be done towards removing them; of necessity he will do great harm to those entrusted to his care, and destroy more than he will save; though this is unhappily every where practised by bold daring Fellows, to the great detriment of mankind, and to the disgrace of this truly noble Art. For “ Knowledge ^c ought to direct the Hands, and shew them what is proper for “ them to perform.” Therefore if any *Surgeon* has been long in Practice, and, as they are fond of terming it, is a *Man of great Experience*, and is not thoroughly versed in *Anatomy*, and the Institutions of *Surgery*, his actions are always doubtful and uncertain, and are ever obnoxious to multiplicity of dangers. Therefore it is necessary for the good Surgeon to be a thorough Master of both; but he whose comprehensive Knowledge takes in all the other branches of *Physic*, as many amongst the ancient and modern *Physicians* have done ^d, is by so much the abler and more accomplished *Surgeon*.

IV. The end of *Surgery*, as appears by what we said above at N^o I. is three-^{The end of} fold: 1. *To preserve mankind in a sound State*, in the manner we explained it at ^{Surgery.}

^a This is very rarely the case in *England*, but too common in *Germany*.

^b Lib. VII. in Præfat.

^c CELSUS speaks more largely of this Lib. I. in Præfat.

^d As ÆSCULAPIUS, PODALIRIUS, MACHAON, HIPPOCRATES, GALENUS, CELSUS, ÆTIUS, ÆGINETA, ORIBASIUS, GUIDO CAULIACUS, SALICETUS, VESALIUS, FALLOPIUS, MARIANUS SANCTUS, JO. DE ROMANIS, VAROLIUS, CABROLIUS, FABR. AB AQUAPENDENTE, M. A. SEVERINUS, HILDANUS, SPIGELIUS, GLANDORPIUS, GEIGERUS, SCULTETUS, MARCHETTUS, ROLFINGIUS, WEPFERUS, MURALTUS, SOLINGENIUS, RUYSCIUS, BIDLOUS, NUCHIUS, GROENVELTIUS, CYPRIANUS, BOHNIUS, BRUNNERUS, RAVIUS, LAUSDENIUS, &c.

Nº II. 2. *The Restitution of a sound State*; that is, the cure of diseases by the Assistance of the Hands. Or, 3. *To preserve the Life of a Man*, though with a maimed and wounded Body, if it is impossible to render it entire. This third end is chiefly obtained by the amputation of sphacelated, cancerated, or carious Limbs; so in Cancers, Schirrus's, old Ulcers, and other such like incurable Diseases, and in several Disorders of the Head, especially in weakneses of the Eyes and Ears, to prevent their growing worse, it is usual to order Issues, Setons, frequent Blood-letting, Blistering, &c. though a perfect Cure is not perhaps to be looked for. And therefore under this head may be ranked inveterate *Herniæ*.

Auxiliaries
of Surgery,
what.

V. The *Auxiliaries* or *Means* which *Surgery* makes use of to obtain the ends we have been discoursing of, are chiefly the *Surgeon's Hands* and proper *Instruments*. For as often as a fractured or dislocated Bone is to be reduced, a Vein to be opened, a Stone to be extracted, or a Cataract depressed, proper Instruments are always necessary. But that every thing may go on with more speed, ease, and safety, the administration of proper internal Remedies, and the regulation of Diet, will never be neglected, in any of the foregoing cases, by a prudent *Surgeon*; which confirms the saying of CELSUS, “^a That all the parts “ of Physic are so intimately connected, that it is impossible to separate any “ one of them entirely from the whole.” And in another place^b, “ I, says he, “ can easily conceive one man to be capable of performing all the offices of “ Physic, and, where they have been divided, think him praise-worthy that “ unites them in himself.”

Origin of
Surgery.

VI. The strong connection that there is between *Physic* and *Surgery*, is, in my opinion, a persuasive argument that the Origin, Progress, and Fate of both, were always the same. Though, to say truth, I cannot help believing with CELSUS^c, and others, that *Surgery* is more ancient than any other branch of *Physic*, and near coeval with Mankind, and therefore the true Parent of *Medicine*. The nearer Mankind was to its first original, at so much the greater distance were they, as CELSUS observes, from Luxury and Debauchery, and of consequence so much the farther removed from internal Diseases. The native strength of Man, as yet unhurt by Intemperance, stood in no need of internal Aids. But on the other hand, even in the earliest times, Men were as liable, as we are to this day, to external Injuries, which require the assistance of the *Surgeon's Hand*. For who in those days was secure from falling, or from Fractures of the Bones, which are the consequences of such accidents; from the Bites of wild Beasts; or from the Wounds of an open or an insidious Enemy? Since in the very first Ages men waged war with each other, can it be reasonably supposed that they were always free from Bloodshed, fractured and dislocated Bones, &c. As therefore it cannot be doubted, but that by the direction of Nature, who taught them to extract Thorns, and to tie up Wounds, to prevent a large Effusion of Blood, they by degrees were used to receive assistance from the hand of some kind of Instruments; and if by chance, after many repeated experiments of this kind, any thing should be found to answer the desired end, diligent Men would certainly retain it in their Memories, and mark

^a In Præfat. Lib. V. item SCRIBONIUS LARGUS, Cap. LXVIII.

^b In Præfat. Lib. VII.

^c In Præfat. Lib. I.

it down. which being repeated with success in similar cases, was handed down to posterity. So this salutary Profession took its rise from small, and those rude, beginnings and vulgar Experiments, till by degrees it received Improvements, and was brought to its present perfection by the Industry and Sagacity of ingenious Men.

VII. By as much as we can collect from ancient History, the *Chaldeans* and *Egyptians*, who were the first cultivators of Science, as we learn from the Scriptures, found *Surgery* naked and in her infancy, enriched her with new Experiments, and laid her down Rules and Institutions to walk by. And afterwards ^{Improvements of Surgery in Greece.} *Surgery* was still much farther enriched by the *Greeks*, those ancient and noble Patrons of Knowledge. *APOLLO* and his Son *ÆSCULAPIUS* were chiefly celebrated as Surgeons in those ages, who for their Sagacity in cultivating this Science, gained to themselves so great Applause, that they were reckoned among the number of the Gods. After these came *PODALIRIUS* and *MACHAON*, two sons of *ÆSCULAPIUS*, who accompanied *AGAMEMNON* to the *Trojan* War, and were of great service to the Army. But *HOMER* never takes notice of them as being serviceable in the Plague or other kinds of Distempers, but only as Persons skilful in healing Wounds by the application of Instruments and Medicines. From whence it appears, that they were only expert in *Surgery*, and that it is the most ancient Branch of *Physic*. We read of *CHIRON* the *Centaur*, and other *Surgeons* after them, who equalled them in reputation, but the monuments of those days are long ago entirely defaced by time. *HIPPOCRATES* the *Coan* seems to have far exceeded all the rest in sagacity and success; *CELSUS* declares of him, “that he was not only celebrated “for Wisdom and Art, but for Eloquence also.” He inherited *Surgery* by descent, being sprung from the race of *ÆSCULAPIUS*. With no less judgment than assiduity he formed a compleat System of the Experiments and Rules of his Ancestors, with their various and elaborate Methods of Cure; which he greatly improved, through the assistance and directions of *DEMOCRITAS*, by his constant and indefatigable attention to the study of *Human Anatomy*^b. For which reason, they are by no means deceived who have pronounced *HIPPOCRATES* the Father of all Branches of *Physic*, but more particularly of *Surgery*. The Writings of this great Man, notwithstanding they are the most ancient, so far exceed all the rest, that at all times they have been laid down as examples to all Professors of *Physic*.

VIII. The *Greeks*, by their strenuous application to the study of *Surgery*,^{Proficiency of the Romans, Greeks, and Arabians in Surgery.} excited a desire in the *Romans*, and at the same time in the *Egyptians*, to give encouragement to the same Art. “About this time, a little before the “birth of *CHRIST*, *PHILOXENUS* was eminent in *Surgery*, who, according “to *CELSUS*, wrote several Volumes upon this Branch of *Physic*. *GORGONUS* “also and *SOSTRATUS*, and *HERONES*, and the two *APOLLONIUS*’s, and *AMMONIUS ALEXANDRINUS*, and many other famous men, all enriched this “Science with something new. At *Rome* also, saith the same Author, there “were Professors of great note, especially *TRYPHON* the Father, and *EUELISTUS* the Son of *PHLEGES*, and, as we may gather from his Writings, the

^a Vide *CELS.* Lib. I. Præf.

^b As *CELSUS* testifies, Lib. I. Præf.

^c See *CELSUS* in Præf.

“ principal

“ principal of all, MEGES; all of them by various Emendations still added
 “ Improvements to this *Science*.” But the Writings of these men are not transmitted to us. In the Ages next after CHRIST, CELSUS acquired the greatest name amongst the *Latin Writers*, (on whom we have bestowed repeated Encomiums) but among the *Greek Writers*, GALEN, PAULUS ÆGINETA, ÆTIUS, and ORIBASIVS; whose Works are still extant. But after this, in the subsequent ages, the barbarous Nations began to over-run the whole Earth, and *Surgery* was so far from encreasing, that it received the same fate with all other Branches of *Science*, and suffered under the common calamity. Therefore it is no wonder that those times produced no one to whom *Surgery* was indebted, if you except only RASES, HALY ABBAS, ALBUCASIS, and AVICENNA, who flourished in *Arabia* about the XIth or XIIth Century. It is to be observed though by the way, from GUIDO DE CAULIACO^a, the *Physicians* at this time first refused to undertake the performance of any *manual Operation*, though indeed in CELSUS’s time there were some who separated *Surgery* from *Physic*.

Industry of
Surgeons of
a later date.

IX. In the XIIIth and XIVth Centuries, when the clouds that had overshadowed all *Science* began to disperse, *Surgery* also again emerged with the rest, and was cultivated both by *Physicians* and *Surgeons*. At first arose BRUNUS, THEODORICUS, SALICETUS, LANFRANCUS, ARNOLDUS DE VILLA NOVA, and many others equally eminent: but afterwards, in a still more conspicuous light, shone that true Restorer of *Surgery* GUIDO DE CAULIACO, DE LARGELATA, JO. DE VIGO, VESALIUS, FALLOPIUS, ANDREAS A CRUCE, ARCAEUS, MARIANUS SANCTUS, ANGELUS BOLOGNINUS, BERENGARIUS CARPUS, ALPHONSUS FERRIUS, JOANNES TAGOLTIUS, BARTHOLOMAEUS, MAGGIUS, PARAEUS, SCHILLHANS, GERSTOFF, BRUNSVIC, RYFF, and others, who greatly contributed, as appears by their Writings, to the Improvement of *Surgery*.

Of the Mo-
dems.

X. At length in the last and present age, by the industry first of the *Italians*, *French*, *Germans*, and more latterly also of the *English*, *Surgery* has been so wonderfully enrich’d with extraordinary Inventions and Observations in *Anatomy*, *Mechanics*, and *Physic*, and with elegant Instruments and new methods of Curing, that it seems to want little or no addition to raise it to its highest state of Excellency and Perfection. But although I purposed now to give a regular account of those by whose labours *Surgery* has gained the fruits it at present enjoys, yet since the number of those is so large, let it suffice for the present to reckon up the principal of them; leaving the enumeration of the rest to another opportunity. In this rank we may reckon FABRICIUS AB AQUAPENDENTE, FABRICIUS HILDANUS, M. A. SEVERINUS, SPIGELIUS, MARCHETTUS, GLANDORPIUS, JO. SCULTETUS, FELIX WURTZIUS, GUILLEMEAU, CÆSAR MAGATUS, CASP. TALIAACOTIUS, GOUSMELINUS, RONHUYSIUS, VAN NEEKEREN, CORN. SOLINGEN, NUCHIUS, BURMANNUS, MAURICEAU, TOLET, VERDUCCIUS, BIDLOUS, RUYSCHIUS, BOHNIUS, CYPRIANUS, RAUIUS, MASSIERUS, DIONIS, PETIT, WISEMAN, DOUGLAS, CHESELDEN, GARENGEOT, MARINUS, TURNER, MORAND, LE DRAN, and many others, whom you will find among the *Chirurgical Writers*.

^a See his *Chirurgical Works*.

XI. Before we proceed farther, I think it will be of service to the Students in Surgery, to inform them of the best Writers that have treated of particular parts of *Surgery*, and have either handled these separately, or at least with superior success: in describing of these I shall observe, as near as I can, the same order, in which this book is disposed. And first, the following Authors have treated of *the five principal parts of Surgery*, to wit, *Wounds, Fractures, Luxations, Tumors, and Ulcers*; VESALIUS, TAGULTIUS, ANDR. A CRUCE, FABRIC. AB AQUAPENDENTE, then CORTESIUS, PECCETIUS, WISEMAN, MUNNICK. Writers on particular parts of Surgery.

XII. The following Writers upon *Wounds* in general well merit reading; Authors on Wounds. PARÆUS, ARCÆUS, FABRICIUS AB AQUAPENDENTE, GLANDORPIUS, MAGATUS, BELLOSTIUS. Upon *Wounds of the Head* in particular; HIPPOCRATES, CELSUS, CARPUS, ARANTIUS, PAVIUS, MILLERUS, SCHULTZIUS, WALTHERUS, and ROHAULT, a modern *Frenchman*. On *Diseases of the Eyes*; FALLOPIUS, JO. LANGIUS in *Ephemerid. N. C. Cent. V. & VI.* ST. YVES. On *Wounds of the Breast*; FUMANELLUS, PECHLINUS. On *Gunshot Wounds*; PLAZZONUS, MAGGIUS, FERRIUS, ROTA, PARÆUS, FALLOPIUS, GUILLEMEAU, HILDANUS, BOTALLUS, BURMANNUS, TASSIN, VERDUC, VAUGUION, CHARRIERE, and, tho' last, not the least eminent, LE DRAN. Of *Tents*; BAIETUS. Of the *Abuse of Tents in Wounds*; MAGATUS, BELLOSTIUS, and a late *French* piece of CHABERT's, and of LUPUS in *Italian*, who have maintained that Wounds should seldom be kept open by Tents. Useful *Observations on Wounds* have been published by SCULTETUS, BELLOSTIUS, SCHWARTIUS, DE LA MOTTE, CHABERT, LE DRAN: The best discourses on *Mortal Wounds*, and the method of discovering them to be so, have been written by BOHNIUS, TEYCHMEYERUS, ZACCIIAS, AMMANNUS, VALENTINUS, ZITTMANNUS, FRID. HOFFMANNUS: To the same purpose is a book whose title is, *The Art of forming Prognostics in Surgery*, in *French*, and BLEGNIUS upon the same subject.

XIII. On *Fractures and Luxations*; PARÆUS, AQUAPENDENS, HILDANUS, VERDUC, in a particular volume on this subject; LE CLERC in his *Osteology*; PETIT's *Art of curing the Diseases of the Bones*, in *French*; PALFINUS, in *Dutch*. On *Fractures of the Cranium*; HIPPOCRATES, CELSUS, CARPUS, BERENGARIUS, CORTESIUS, PAAW, and the Authors above recited, who have discoursed on Wounds of the Head. On Fractures and Luxations.

XIV. On *Tumors*; INGRASSIUS, FALLOPIUS, ARANTIUS, SAPORTA, M. A. SEVERINUS, SCHELHAMMER, CALVERS, MAUBEC, in *French*. On *Suppuration*; LAZERME. On *Abscesses*; SEVERINUS. On the *Carbuncle and Pestilential Bubo*; FALLOPIUS, GEMMA. On *Œdema and Schirrus*; HARRIS. On *Fungous Tumors of the Limbs*; SLENOGTIUS. On *Gangrene and Sphacelus*; HILDANUS, KOENERDING, HARRIS. On *Burns*; HILDANUS. On a *Cancer*; ALLIO, GENGRON, HELVETIUS, HARRIS, and much earlier TEXTOR. On *Ulcers*; TAGAULTIUS, BONONINIUS, FALLOPIUS, AQUAPENDENS, VERDUC, LE CLERC. On *Caries of the Bones*; PETIT. On a *Spina Ventosa*; SEVERINUS, PANDOLPHINUS, MARCHETTUS, and WALTHER, in *High Dutch*. Of Tumors and Ulcers.

XV. The best Authors on *Chirurgical Operations* in general, are CELSUS, On Chirurgical Operations. ÆGINETA, PARÆUS, FABR. AB AQUAPENDENTE, SOLINGEN, NUCHIUS, VERDUC, VAUGUION, CHARRIERE, DIONIS, PAFYNUS, MASSIERUS, GARENGEOT, MARINUS, LE DRAN, SHARPE.

XVI.

Of Blood-
letting, and
Operations
of the like
nature.

XVI. On *Bleeding* in particular, besides many others, you will find BOTALLUS, P. P. MAGNUS, SCHMID, JONDOT, VERNA, MELLIUS, CRONE, HARRIS, SILVA, CHEVALIER, HECQUET, QUESNAY, MARTIN. On *Bleeding oftener in the Jugular Vein*; TRALLES. On the *Aneurism*; BARTHOLIN, HORN, HARRIS. On *Infusing Humours into the Blood*; MAJOR, ETTMULLER, ELSHOLZIUS. On *Transfusion*; LOWER, STURMIUS, SANTINELLUS, MAFRIDUS, MARKLINUS, BURMANNUS.

Of Operati-
ons which
are perform-
ed on various
parts.

XVII. Of *Inoculation of the Small Pox*; MAITLAND, PILARINUS, LE DUC, VATERUS, WREDEN, HARRIS. Of *Cupping and Scarifying*; CELSUS, GALEN, MAGNUS, BOTALLUS, MANNUS, MELLUS. Of the *Abuse of Cupping in Putrid Fevers*; AQUAPENDENS. Of the *Egyptian Method of Scarifying*; ALPINUS, STAHLIUS. Of *Leeches*; GALEN, MAGNUS, HEURNIUS, STAHLIUS. Of *Puncture with a needle after the manner of the Japonese*; RHYNE, and KOEMPFERUS. Of *Issues*; GALVANUS, in *Italian*; GLANDORPIUS, RESTAURANT, and SCHORETUS, in *High Dutch*. Dissertations on this subject have been written by ALBINUS, SCHELLHAMMERUS, SCHACHERUS, FR. HOFFMANNUS, HILSCHERUS, and others. On *Cantharides*; GEYERUS, ALBINUS, WEDELIUS. On the *Use of Blisters*; CAIUS, NENTERUS, FR. HOFFMANNUS, LAETIUS A FONTE, and HERCULES SAXONIA. On *Cauteries*; ALBUCASIS, CAPIVACCIUS, GAVASSETIUS, SEVERINUS, COSTÆUS, MAGNUS, FALLOPIUS, FIENUS, BARTHOLINUS, BAUHINUS, SLEVOGTIUS. On the method of using the *Indian Moss (Moxa)*; TEN RHYNE, CLEYERUS, VALENTINI, LE TEMPLE. Of *Atheromata* and *Steatomata*; GORTESIUS, JO. LANGIUS, ELSHOLSTIUS. Of the *Meliceris*; HILDANUS, SEBIZIUS. Of *Encysted Tumors*; SLEVOGTIUS. Of *Extracting foreign Bodies from Wounds*; BIDLOO. Of *Amputation of the Limbs*; FIENUS, HILDANUS, HOFFMANNUS, HILSCERUS. Of a *new Method of taking off Limbs*; JONGE, VERDUIN, RUYSCHIUS, KOENERDINGIUS, SALZMANNUS.

Operations
on the Head.

XVIII. Of an *Issue upon the Coronal Suture*; SLEVOGTIUS. Of *Arteriotomy*; FIENUS, SEVERINUS, ALPINUS, SCHEURLIUS. Of the *Hydrocephalus*; CORTESIUS. Of *Trepanning*, and particularly of the difficulties that attend that Operation; FIENUS, BOHNIUS, COSCHWITZIUS.

On the Eyes.

XIX. Of *Disorders of the Eyes*; BARTISCHIUS, who has very accurately delineated many of the Diseases of the Eyes; GUILLEMEAU, READ, COWARD, MAITRE JEAN, KENNEDY, ST. YVES. Of the *Trichiasis*; HEISTER. Of *Scarification of the Eyes*; MANCHARTUS, PLATNERUS. Of the *Fistula Lacrymalis*; ANELLUS, HEISTER, MELLIUS, in *Italian*, PLATNERUS. Of a *Cataract*; MAITRE JEAN, BRISSEAU, WOLHUSIUS, HEISTER, WIDEMANNUS, MARINUS. Of the *Hypopion*; BIDLOUS, and MAUCHARTEUS, who likewise published treatises on the *Ectropion*, the *Fistula in the Cornea*, the *Empyema*, and other Diseases of the Eyes.

On the Nose
and Mouth.

XX. Of a *Polypus of the Nose*; GLANDORPIUS. Of the *Hair Lip*; MARINUS. Of *Disorders of the Teeth*, and the Methods of remedying them; GUILLEMEAU, STROBELBERGERUS, CRONE, and FRAUCHARD, a *Frenchman*, who lately wrote a Treatise called *Le Chirurgien Dentiste*. Of the *Epulis* and *Parulis*; SCHELLHAMMERUS.

On the Neck
and Breast.

XXI. Of *Laryngotomy*; CASSERIUS, MOREAU, FIENUS, DEKKERUS, MONAVIUS, FONTANUS, MASSIERUS. Of *Strumæ* and *Scrophulæ*; LAURENTIUS, BROWNE, GIBBS. Of *Setons*; GALVANUS, JO. FRANCUS, WEDELIUS, METZGERUS.

GERUS. Of the *Cancer of the Breasts*; see above, under the *Head Cancer*. Of *Gibbosity*; WEDELIUS.

XXII. Of a *Paracentesis*; there are several academical Theses extant upon this Subject, by MEIBOMIUS, ALBINUS, SLEVOGTIUS, HENNINGERUS. Of the *Cæsarean Birth*; ROSSETUS, BAUHINUS, DOERING, HILDANUS, BULEAU, RAYNAUDUS, FIENUS, LANKISCHIUS, CYPRIANUS, SLEVOGTIUS. Of *Hernie*; PETRUS FRANCUS, GEIGERUS, LE QUIN, LAUNAY, BERENGER, VON HAMMEN, WIDEMANNUS; HARRIS, HOUSTON, in *English*; JO. SERMES, in his Book of *Lithotomy*, in *Dutch*, and divers academical Theses; in particular upon the *Hernia Incarcerata*, by MAUCHART; on the *Crural Hernia*, by KOCHIIUS; on the *Enterocoele*, by ROLFINCIUS and PETERMANNUS; on the *Sarcocele*, by MARINUS; on the *Hydrocele*, by the same; and on the *Abuse of Kelo-tomy*, HEISTER.

XXIII. Of a *Phimosis* and *Paraphimosis*; WEDELIUS. Of the *Closure of the natural Passages*; WIERUS. Of *Imperforations*; WEDELIUS. Of *Hypospadiacs*; LAVATERUS. Of *Passing the Catheter*; MEIBOMIUS, MARINUS. Of a *Stone in the Urethra*; MARINUS. Of a *Caruncle in the Meatus Urinarius*; FERRIUS, LACUNA, BENEVOLUS. Of *Fistulae in the Urethra*; HILDANUS, MARCHETTUS, BECKERUS.

XXIV. Of *Lithotomy*, and particularly of what they call the great Apparatus; MARIANUS SANCTUS, HILDANUS, TOLETUS, GROENFELD, ALGHISIUS, MARINUS, CALLOTUS. Of the lesser Apparatus; CELSUS, ALBUCASIS, CAULIACO; but it was afterwards laid aside; yet not long since MARINUS, an *Italian*, defended it in some particular cases, though by others it is altogether rejected. Of the *Highb Apparatus*; PETRUS FRANCUS, ROSSETUS, JO. DOUGLAS, CHELSEDEN, MIDDLETON, MORAND, J. SERMES, PROEBISCHIUS, and HEISTER. Of FRERE JACQUES's Method; MERYUS, LISTERUS, DIONIS. Of RAU's Method; ALBINUS, HERTIUS, and JAC. DENYSIUS. Of the *Lateral Operation*; JAMES DOUGLAS. Of the different Methods of cutting for the Stone; PYE, an *Englishman*, and LE DRAN, a *Frenchman*; and SCHEFFERUS, and HERTIUS, in their Academical Theses, and others. Of FOUBERT's Method; KESSELRING. Of the Methods of curing the Stone, invented by FOUBERT, GARENGEOT, PARCHET, LE DRAN, and LE CAT; GUNZIUS. Of the Abuse of Tents after Lithotomy; HILDANUS. Of the Puncture of the Bladder in a Suppression of Urine; MARINUS, MEYERUS.

XXV. Of the Art of Midwifry; among the Ancients, RUPEUS, RUEF, RHODIO, PARÆUS. Among the Moderns; SCIPIO MERCURIUS, MAURICEAU, PEU, PORTAL, VIARDEL, VOELTERUS, SIGISMUNDA, a Midwife of Brandenburg, DEVENTER, DIONIS, MELLIUS, ST. AMAND, DE LA MOTTE, HOORN, SUECUS, WIDEMANNIA. Of the Method of extracting a dead child; HIPPOCRATES, SOLINGEN, FONTANUS, and the Authors we have just recited. Of the bearing down of the Womb; BECKIUS.

XXVI. Of *Clysters*; LANZONUS, SWARTZIUS. Of the *Fistula of the Anus*; MARCHETTUS, LE MONNIER, GLADBACCIUS, BASSIUS.

XXVII. Of the *Paronychia*; GLANDORPIUS, WEDELIUS, ALBINUS. Of the Suture of the Tendons; KISNERUS. Of Clefts in the Feet; WEDELIUS. Of Ingrafting; TALIACOTIUS, SALTZMANNUS.

On Bandages.

XXVIII. Of *Bandages*; GALEN, translated by VIDO VIDIVS, with Figures; PARÆUS, in his *Surgery*, Part III. VERDUC on *Bandages* in *French*, and SOLINGEN; but the best Writers of all are LE CLERC, in his *Appareil Commode*, and BASSIUS in *High Dutch*, and ULHORNIVS. Of *Chirurgical Instruments* you may consult ORIBASIUS, PARÆUS, and SCULTETUS.

Writers of Observations.

XXIX. Of *Observations in Surgery*; the best are related by PARÆUS, HILDANUS, SCULTETUS, MARCHETTUS, TULPIUS, MECKEREN, ROONHUSIUS, LAMBSWERDIUS, RUYSCHIUS, BELLOSTIUS, PURMANNUS, SAVIARDUS, DE LA MOTTE, CHABERT, LE DRAN.

Miscellaneous Writers.

XXX. Of the *Principal Controversies in Surgery*, consult FIENUS. On the *Duties of a Surgeon in the Army*, read FRANC. DE ROMA, MURALTUS, SCHMID, TASSIN, PURMANNUS, BELLOSTIUS, ABEILLE. Of *Surgery in the Time of a Plague*; PURMANNUS. Of *Chirurgical Anatomy*; GERGA, CHESELDEN, PALFINUS. Of *Medicines used in Surgery*; HOLLERIUS, PIGRÆUS, WURTZIUS, HILDANUS, in his *Tract de Cistâ Militari*, ETTMULLER *de Chirurgiâ Medicâ*, LE CLERC, VERDUC DE FASCIIS, and BELLIOS in *Pharmacîâ Chirurgicâ*. *Chirurgical Instruments* are best described by ALBUCASIS, ANDR. A CRUCE, HILDANUS, GUILLEMEAU, FABR. AB AQUAPENDENTE, PARÆUS, SCULTETUS, SOLINGEN, MASSIERUS, DIONIS, HEISTER, and GARENGEOT.

Knowledge of Languages necessary to a Surgeon.

XXXI. Since many of the most valuable Treatises in Surgery have been published in the Learned as well as in the Modern Languages, it will easily appear of what great Service it will be to the Surgeon, to be well versed in those Languages, especially the *Latin* and *French*, since without this Assistance they will reap very little advantage from the Inventions of others: but whoever is moderately versed in the *Latin* Tongue, I would advise him to procure the Academical Theses upon Chirurgical Subjects which are yearly published, for the Expence is trifling, and the Advantage that accrues from reading them, is by no means so; for they frequently contain many new and useful Observations, Descriptions of Instruments and Machines, and new Methods of Cure, that are not to be met with in larger Volumes.

Division of Surgery into its Parts.

XXXII. Hitherto we have treated of the Nature and End of Surgery, described the Aids that are necessary to it, and related the Fortunes it has met with in different Ages; Order therefore now requires us to proceed to its Division, which is very different according to different Authors. There are many Professors of Surgery who divide this Art into six parts, and distinguish each of them with a *Greek* Name. These are, 1. *Synthesius*. 2. *Diæresius*. 3. *Exæresis*. 4. *Aphæresis*. 5. *Prosthesis*, and, 6. *Diorthosis*. On the other hand, some divide it into five, some into four, some into three parts, whilst others assert that it may be comprehended under two of these Divisions. But since Persons ignorant of the *Greek* Language are easily puzzled with *Greek* Terms, and besides that the Distinctions are not just, as not comprehending all parts of Surgery, it seems to be high time to abolish them, as we live in an Age, more inquisitive after things than words: more especially as these Terms would perplex the Memory of young Students in Surgery, who for the most are unacquainted with the *Greek* Language. Some, lastly, have been fond of dividing Surgery into five parts, the first treating of Wounds, the second of Ulcers, the third of Fractures, the fourth of Luxations, the fifth of Tumors. Though even this

Method

Method of dividing by no means satisfies me, since the whole Art cannot be clearly explained, by speaking to each of these Heads.

XXXIII. Wherefore in my Judgment, it is best to divide *Surgery* into the three following Parts, by which means the whole Art may be laid down and taught with Clearness. The first, which is called *Pentateuch* by FABRICIUS AB AQUAPENDENTE, from the number of Chapters it is comprised in, treats of the Disorders that are most common to the Human Body, and takes up five Books. 1. *Of Wounds.* 2. *Fractures.* 3. *Luxations.* 4. *Tumors,* and, 5. *Ulcers.* The second Part treats of *Chirurgical Operations*, (as they are commonly called) describing at the same time all such Disorders of the Human Body as are to be relieved by the Assistance of the Hand, and could not properly be described in the first Part. Lastly, *Chirurgical Bandages* will be the subject of the third Part, which we shall describe in so clear a manner, that it will be very easy to learn not only how each of them is to be made, according to the Nature of the Disease or of the Limb, but also how they are to be applied, to the Benefit of the Patient; for though we find that *Surgeons* have paid very little regard to the Descriptions of Bandages in their Writings, it is nevertheless not only extremely useful, but absolutely necessary. Sometimes Accidents happen of such a Nature, as Luxations, Fractures, Hæmorrhages, Herniæ, as only to admit of Help by Bandages, and where without such Assistance the Cure would be extremely doubtful or desperate; besides this, by a neat and dextrous Application of a proper Bandage, the Surgeon not only gains the Admiration of the Standers by, but his Patient also puts more Confidence in him, which very often forwards the Cure wonderfully.

The Author's Division of Surgery.

XXXIV. Lest any one should be ignorant of the Method which I intend to observe in expounding the Chirurgical Doctrines which I am going to lay down, I shall give a brief Description of it in this place. That those who are desirous of acquiring a thorough Knowledge of *Surgery* may not be disappointed, I shall not, according to the Custom of many others, content myself with solely describing the Instruments and Machines that are made use of by Surgeons to relieve suffering Nature, neglecting at the same time the History of Diseases, and the Regulations that are to be observed with regard to Diet and Medicine, as if they were not things necessary for the Surgeon to be acquainted with; but, on the contrary, I shall use the utmost Diligence to explain, as clearly as it is possible, 1. The proper Nature and Disposition of the Disorder. 2. What Parts of the Body are liable to be affected by this or that Disorder. 3. What the peculiar Symptoms of each Disorder are, and how to form a proper Prognostic by them. 4. I shall describe the principal Chirurgical Instruments which are best adapted to each Case, of which you will find Copper Plates, for the most part of the same size with the Instruments which they represent. 5. I shall not only shew the best Method of performing all Operations in Surgery; but, 6. in what manner the Patient is to be treated after the Operation, so as to recover his Health in the most speedy, safe, and pleasant manner; and this not only with regard to the Dressing and Bandages which are to be applied to the Part, but also with respect to the Medicines which are proper to be administered, and the Rules which are to be observed as to his Diet.

The Author describes the Method that he intends to follow in Writing.

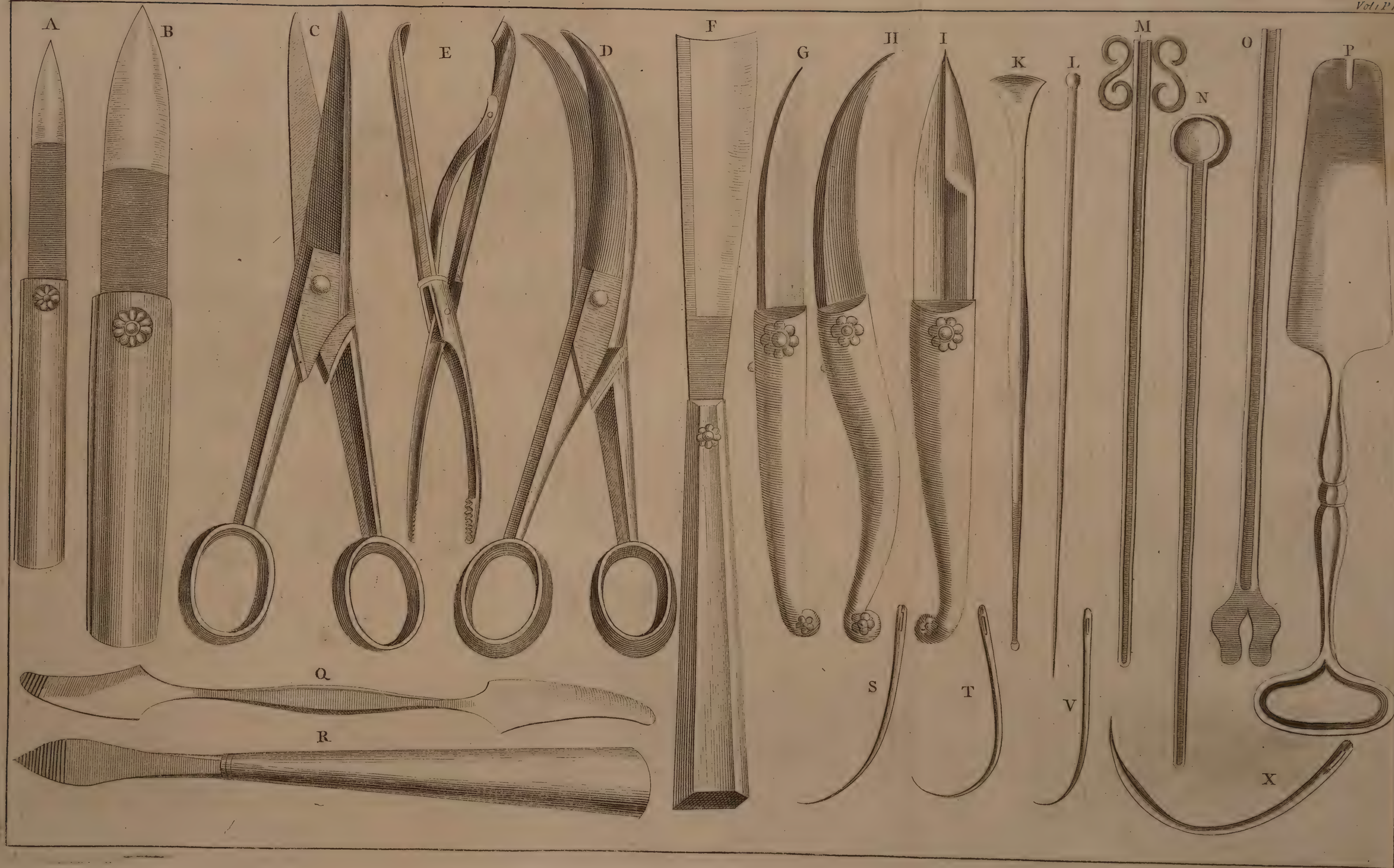
XXXV. We

The Know-
ledge of In-
struments is
recommended,
and a
Supply of
them pro-
vided.

XXXV. We declared above that a Surgeon's Hands would be of little Service to him, if he was not supplied with Variety of Instruments, which he ought to be very well instructed in, that ever hopes to arrive at a proper use of them in the Cure of Diseases. Therefore that we may the more readily form our Surgeon, it will be well worth our while to treat briefly of the necessary Apparatus of Instruments which he is to be furnished with, before we are solicitous about teaching him the manner in which they are to be used. I cannot deny but that there are a great number of Chirurgical Instruments to be found in Chirurgical Authors; but, at the same time, I can with truth affirm, that many of them are obsolete and useless, and many of excellent use have been omitted, (especially at the Time when I first published my Book of Surgery in the *German* Language in the Year 1718.) therefore it seems necessary to publish a Description, not only of the most modern Chirurgical Instruments, but of those best adapted to use, keeping up to their proper size as much as possible in the Plates. Whether our Plates have satisfied this end or not, let others judge: this I am certain of, that I have made it my study to save Students in Surgery the Labour of having recourse to many Volumes to search after proper Instruments, and to exhibit to their View all the best and most general Instruments in one Book; and in some places they will find Copies of Instruments which are not to be found in other Authors. GARENGEOT published a Book in *French* on Chirurgical Instruments, in which he exhibited many new and correct ones, but delineated in too small a size, which easily led Surgeons and Workmen, who endeavoured to imitate them, into Errors; the chief of these I have copied into this Book, and, wherever my Page would admit of it, I have given you the true Dimensions of the Instruments, in order to render them more useful. But as it is of much more service to examine the Instruments themselves than the Plates of them, therefore a Surgeon ought to neglect no Opportunities of examining and contemplating upon the best he can lay his hands on, and especially the newest invented. For my own part, when I read Chirurgical Lectures, I always shew my Pupils all kinds of Instruments that are used in Surgery, and point out the Defects of the Ancients, and the Improvements of the Moderns.

Pocket In-
struments
described.

XXXVI. But in the first place, as they are more immediately necessary, and are in constant use, I shall describe the Instruments in their true Dimensions, which a Surgeon ought always to carry about him in a proper Case, and are therefore called *Pocket Instruments*. To this place belong those Instruments in particular, which are described in Plate I, under the Letters A and B; *two Lancets* of different sizes. These are used, especially the smaller sort, in opening Veins, for which reason the *Greeks* called them *Phlebotoma*; but the larger sort are used to open Abscesses with, and are therefore called by the *French* *Lancettes à l'Abces*. The Letter C shews a pair of *strait Scissors*, fit for many uses; the Surgeon should have several pair of these at home, of different sizes, as they are necessary in different Disorders. D, a pair of *crooked Scissors*, proper to be used in dividing *Fistulae*, and in many other cases. E, a pair of *Forceps* furnished with Teeth at one End; these are used to remove Dressings, and sometimes to extract Splinters or Thorns; they are also serviceable to the Surgeon in his Anatomical Exercises. *Forceps* of this kind are commonly made of Steel, but those of Silver are much neater. F, a *Razor*; G, a *strait Incision Knife*,



Knife, by the *French* called *Bistouri*; H, a *crooked Incision Knife*; I, a *streight double-edged Incision Knife*; K, a *Probe*, which the *French* call *Une Sonde*; one End of which is broad and thin, for discovering a Fissure in the *Cranium*, and other uses; the other End is rounded with a Nob, to examine the Depth and Situation of Wounds and Ulcers: for which uses also the Probe at Letter L may serve. The neatest Probes are made of Silver, though they are frequently also made of Steel, Ivory, or Whalebone, M, represents a *grooved Probe* or *Director*, to direct the Edge of the Knife or Scissors in opening *Sinus's* or *Fistulae*, that by this means the subjacent Vessels, Nerves and Tendons may remain unhurt; the Ornament at the upper part of it is for a Handle, though sometimes that End is made in the Form of a Spoon, as you may see in the Figure at N, to contain a Powder to sprinkle upon Wounds or Ulcers; sometimes also it is forked at the End to divide the *Frænum* of the Tongue, as at the Letter O. Nor must we here omit the *Spatbula*, as described at the Letter P. The use of this Instrument is to depress the Tongue, in order to examine the state of the Tonsils, Uvula, and Fauces, when they are affected with any Disorders; it is also used to suspend the Tongue, when the *Frænum* is to be divided; for which purpose it has a Fissure at its extremity, and should therefore be rather made of Silver than of any other Metal. The following *Spatbulae* also at Q and R, somewhat resemble this: These are chiefly used in spreading Plasters, Ointments and Cataplasms, sometimes with their fulcated Extremity they are of Service in raising up fractured Bones of the *Cranium*. Here likewise, in the last Place, we must remember different sorts of *Needles*, *straight* and *crooked*, for stitching up of Wounds, taking up of Arteries, and many other uses: I have given you crooked ones of different Sizes at the Letters S, T, V, X.

XXXVII: What I have said concerning the Instruments that are immediately necessary for a Surgeon to be provided with, is sufficient; I shall proceed now to describe other things, with which he is equally obliged to be furnished, as certain Medicines; such as *Unguentum Digestivum commune*, *Unguentum Aegyptiacum*, aut *Fusum Wurtzii*; for cleansing or digesting foul Ulcers: and some vulnerary Balsam, as the *Linimentum Arcæi*, *Balsamum Samaritanum*, *Peruvianum*, *Capyvæ*, de *Mechâ*, *Unguentum Basilicum*, *Oleum Terebinth.* or *Balsamum Sulph. Terebinthinatum*, &c. To these must be added a Plaster or two, as *Emplastrum Diapalma*, or *Stypticum Crollii*, since they will almost always be required. Neither should a Surgeon ever be unfurnished with a Piece of *Vitriolum Romanum*, to take down luxuriant Flesh, and stop Hæmorrhages; but if you are without Vitriol, its corrosive Intention will be answered by *Alumen ustum*, *Mercurius præcipitatus ruber*, or *Lapis infernalis*, or any other corrosive Medicine, which will also serve to make Issues or open Abscesses, or to perform any Work of that kind. But the Surgeon should always have in readiness a certain quantity of scrap'd Lint, that he may be able to give immediate Assistance to wounded Persons; since, if he is unprepared, they may be easily taken off with an Hæmorrhage, which circumstance ought also to prevail strongly with a Surgeon, never to be entirely unprovided with Bandages.

What Medicines a Surgeon ought to be furnished with.

XXXVIII:

Necessary
Qualifica-
tions for a
Surgeon.

Agility of
Body.
Resolution
of Mind.

Skill in
Physic and
Anatomy.

Frequent
Exercise in
Hospitals.

XXXVIII. We observed above (N. 2.) that it was the business of an able Surgeon readily to apply a Remedy to the Disorders of the human Body by manual Operations with the Assistance of Instruments. We have now described the principal Instruments as well as Medicines with which a Surgeon must of necessity be provided. It remains therefore to examine into the Qualifications he ought to be master of to render him accomplished in his Profession. The Agility of Body, and Resolution of Mind that are necessary to a Surgeon, are elegantly described by CELSUS: “^a A Surgeon (says he) ought to be in his full Vigour, to have a strong, steady Hand, never given to tremble, and to be as ready with his Left-hand as his Right; to have a quick, clear Sight, an intrepid Mind, void of all Tenderneſs, ſo as not to be at all moved by the Outcries of his Patient; to uſe no more Haſte than the Caſe requires; nor to cut leſs than is neceſſary; but he ſhould act in all reſpects as if he was entirely unaffected by his Patient’s Complaints.” But at the ſame time, I would have him behave with ſuch caution as not to proceed raſhly or cruelly, and particularly avoid giving unneceſſary Pain.

XXXIX. The two Qualifications that I have juſt recited, are by no means ſufficient of themſelves to compleat the Surgeon; but there are others alſo which CELSUS has omitted, which are highly uſeful, and conſequently neceſſary. No one will excel in Surgery, unleſs he is firſt furniſhed with a good natural Genius, to which he muſt join a well-grounded Knowledge in Anatomy and Medicine; if he is furniſhed with theſe gifts, he will not only with great Sagacity judge of the Cauſes and Circumſtances of the Disorders upon which he is conſulted, but will with great readineſs make uſe of the beſt Methods, both with regard to the Adminiſtration of Medicines, and the Choice of proper Inſtruments for their Relief; or, if occaſion require, invent new ones, and apply them with Succeſs: whiſt, on the contrary, they who are not Maſters of theſe Qualifications, will daily be guilty of capital Errors.

XL. When theſe ſolid Foundations for Surgery are laid, and the Qualiſications attained, which we have here recommended, our Student muſt by no means omit a proper Attendance upon the Lectures of Profeſſors, and a due Diligence in reading Chirurgical Authors. Thoſe therefore who deſire a thorough Knowledge in Surgery, are not ſatisfied with viſiting Caſes that may accidentally occur to them in their private Practice, but diligently frequent all the Hoſpitals they can get Admittance to, and by this means they ſee more in one Year, than they could otherwiſe do perhaps in the whole courſe of their Lives. But in order to make the greater Proficiency in theſe Schools of Surgery, it will be worth while to diſtinguiſh the different kinds of Disorders that fall under your Inſpection, after what Method, and with what Succeſs they are treated by Maſters of the greateſt Experience. Being prepared by repeated Obſervations of this kind, aſſiſted by the Advice of Maſters, you may at length try your Hand, at firſt upon dead Bodies, and afterwards, when you have Opportunity, upon diſeaſed Perſons; for this trite Saying will always have its Force: *The Artiſt is not made by Reading, Meditating, or Diſputing, but by Practice.*

^a Vid. Lib. VII. Præfat.

XXI. Lastly, that the Surgeon may not appear disagreeable or terrible to his Patients, especially if they are Persons of Distinction or Quality, he should diligently avoid the appearance of Roughness in his Behaviour, or Nastiness in his Dress: For good Breeding and Cleanliness have their proper Effect in all Parts of Life; but the Surgeon gains a particular Confidence with his Patient by his Address, which has no small share in the Success of his Endeavours.

Good Man-
ners and
Cleanliness,

XLII. The Surgeon being endued with these Principles and Qualifications, may safely apply himself to the Practice of his Profession; but that he may succeed the better in the Execution of it, it is proper he should be acquainted with what is his Duty in every step of it. As soon as ever he is introduced to his Patient, he ought in the first place (as HIPPOCRATES well advises) to enquire of him, or his Friends or Domesticks, what ails him? where is the Seat of his Complaint? from what Cause it proceeds? and how long it has been upon him? If there is no particular Objection, he should examine the Part himself, and diligently weigh all that he has heard or seen that may give him any light into the Case, that he may come at a thorough Knowledge of the nature of the Disorder.

The Sur-
geon's Du-
ties to his
Patient.

First, he is
to examine
the Case.

XLIII. Having finished his Examination, the next thing to be done is to consider under what Class of Disorders it is to be ranked, and whether it be curable or not? If it is deemed curable, Whether it will be a Case of Time and Difficulty or not? whether it is curable by Medicines alone? or whether the Assistance of the Knife be necessary? for the safest and most gentle Methods, as CICERO with great Propriety observes, must always be preferred to harsh and dangerous ones, and are always to be tried first, that the patient may not suffer unnecessary Tortures, nor his Life be hazarded through the Rashness of the Surgeon; but to Disorders of a violent nature, dangerous and even doubtful Remedies are to be applied: agreeable to the saying of HIPPOCRATES, (*Apb. 6. Sect. 8.*) "Where Medicines fail, Instruments succeed." They are to be highly condemned, therefore, who, after the Methods of ^a Mountebanks, condemn their Patient who labour under *Hernia*, without regard to Age or Habit of Body, to the Operation of the Knife, when far the greater part of them might be cured by a safer and easier Method. But if you shall find it impossible to save your Patient by gentle Methods, you should declare the Danger to the Patient, or rather to those about him, lest, if the Disorder should get the better of your Art, you should be suspected of Ignorance, or, perhaps, of Knavery.

Whether
curable or
not, and by
what means?

XLIV. If the Surgeon shall find the Disorder to be curable, but to be of such a nature as to require the Knife, he should declare this in due time to the Patient, and should have his Approbation or Consent before he undertakes it; for a Surgeon is not only to take care to stop the Fury of the Disease, and allay present Pain, but also to provide against Accidents that arise from Delay; such as may aggravate and enhance the Distemper, and at last render the Case incurable. In very difficult Cases, where Danger consists not so much

He should
undertake
the Cure
with great
Circumspec-
tion.

^a I saw an Instance of this in a Mountebank, who undertook the Cure of a Boy of about six Years of Age, for a *Hernia*, and not only performed the Operation, but castrated him: when I asked him in private, why he used this hazardous Method without trying a Truss, since his tender Age would easily have admitted of it, he ingenuously confessed he did it for Profit, for he would have been paid but a crown for the Truss, whereas the Operation brought him Ten, if not Twenty.

in Delay, as in the manner of Treatment, the Surgeon not only provides for his Patient's Good, but his own, if he calls in other skilful Practitioners as well in Physic as Surgery, with whom he may consult maturely and deliberately before he proceeds to any Operation; for by this means he will save himself from all blame of having proceeded rashly or ignorantly, especially when he is concerned for Persons of Distinction; if things should go otherwise than he could wish, he will avoid the Charge of having lost a Patient through his Indiscretion, whom perhaps no Art could have saved: Which very Reason should always induce a prudent Surgeon, in Cases attended with Difficulty and Danger, to desire the Assistance, if it can be procured, of the ablest and most experienced of his Fraternity.

He should be furnished with proper Instruments before he begins.

XLV. Having proceeded so far, with the Cautions that I have advised, every thing should now be carefully provided which is necessary for Incision, Dressing, or any other Action, before the Operation be entered upon; but this Apparatus of Instruments and Dressings should never be got ready in your Patient's Chamber, or in his Sight, lest they should strike him with a sudden Fear, and bring on fainting Fits and other Accidents, which would very much disturb the Operation. For the same Reason a Crowd of useless Spectators should never be admitted into the Room, because, besides the Disturbance that they create to the Patient, it is to be feared they will very much annoy the Operator, by intercepting the Light, and filling up the Room: Besides, should any one rudely press upon him, whilst he is performing any nice Operation, it might be of the utmost ill Consequence.

He should encourage his Patient.

XLVI. When the Surgeon is entering upon the Operation, he ought to use his utmost Endeavours to encourage the Patient, by promising him in the softest Terms to treat him tenderly, and to finish with the utmost Expedition; and indeed he should use Expedition but not Hurry, and should be very careful to give no unnecessary Pain, but at the same time to leave no Mischief unremedied; if he observes these Rules, he will be sure to gain Credit with the standers by.

After the Operation the Wound is to be dressed.

XLVII. The Operation being now over, the Surgeon is to consider what remains to be done towards supporting his Patient, and confirming the Cure; the Hæmorrhage occasioned by it is to be stopped, the Wound to be dressed, the wounded Part is to be placed in the most convenient and easy Situation; and it is now time not only to think of preventing any new Disorder falling upon the Part, but to use all Endeavours for restoring Health itself.

Proper Diet is to be advised.

XLVIII. It is his Duty now to prescribe a proper Regimen for his Patient's Diet, to provide him a commodious Apartment in a healthy Air, to encourage him to rest, and to avoid all Passions, and Reflections upon any things that may disturb his Mind; and if any fresh Incision, or other Operation, be necessary, he should be advised readily to submit to it. Every thing should be carefully avoided that may ruffle the Patient, for Disturbances of the Mind are great Enemies to the Health of the Body.

Impertinent Visits should be prevented.

XLIX. Frequent and impertinent Visits to the Sick, from his Friends or others, should be carefully prevented, for they will undoubtedly fatigue and disturb him; but we don't mean by this to cut him off from all Converse with Mankind; a little chearful Company now and then would rather give him Ease, and make him forget his Pains; but I had much rather he should divert himself by attending to others, than by speaking himself.

L. CELSUS declared Physic to be a conjectural Art; these Conjectures therefore must be made with the utmost caution, and the Surgeon also should use the same caution in delivering his Prognostic, when he is called upon, and not, like bold Quacks, promise all will go well, whether the Case is curable or not. For should the Case turn out contrary to your Prognostic, you will either be accused of Knavery or Folly: So if we listen to Reason and ^a CELSUS, it is the Part of a Mountebank to aggrandize a small Performance: an honest Surgeon will always be very careful to avoid both Extremes; it is the Part of a prudent Man to declare from his Conscience what he takes to be the true State of his patient's Case; whether he believes it to be curable or incurable; what Hopes he entertains of his Recovery; and it is particularly incumbent on him to take the utmost care, that he encrease not a Disorder, which appears slight in the beginning, by treating it negligently. In doubtful Cases, where there is reason for great Fear, but not for certain Despair, he should declare his Reasons both for Hope and Fear; but where the Case is extremely dangerous, he should do it to the Relations. Sometimes it is better not to be concerned with a Patient, when it is impossible to be of any service to him, lest you should be said to have killed him, who died by his Disease ^b: But where you are concerned, let the Case be ever so desperate, it is always the Duty of a prudent Surgeon, to cherish the Patient with sweet Words, and give him Hopes of his Recovery; for some Disorders are very much aggravated by Fear, whereas the Expectation of Health and Ease is always so comfortable, that, though it will not cure a Disease, it will at least make it easier to be born.

Great Caution is to be used in prognosticating.

LI. We have already declared what are the principal Duties of a Surgeon; but since the *First*, which is strictly to examine the Case, and the *Sixth*, which concerns the dressing of the Wound, are more immediately necessary, we shall more largely explain what Methods are to be observed both in examining and dressing Wounds. In examining and discovering dangerous and difficult Disorders, the Surgeon requires many Assistances; at first his *Eyes* are necessary to him, by the use of which he will distinguish Wounds, Ulcers, Tumours, Fractures, Cataracts, and most Disorders of the Eye, and a thousand others; but if the Case is of such a Nature that it escapes the Sight, or is not wholly discoverable by it, the Hands are to be called in aid. This happens frequently in Fractures, Luxations, Abscesses, Herniæ, &c. *Instruments* also are sometimes required in this place, especially *Probes*, in discovering the Situation of Wounds, Ulcers, Fistulæ, Fractures of the Skull, Stone in the Bladder, and the like. The *Ears* also are required to give their report of some Disorders; Fractures of the Bones are frequently discovered by the noise which their Extremities make when they are rubbed together; the Sense of Hearing is of so eminent Service in discovering of Stones in the Bladder, that unless the Extremity of the Catheter is heard to strike against the Stone, we are never sufficiently justified in determining a Stone to be there. Some Disorders are discovered by the *Smell*. By the benefit of this Sense we discover the State of Malignity of an Ulcer; and in difficult Births, the *Fetus* is discovered to be dead by the great Stench that proceeds from the Womb, and this is the only Method we have of being certain in this case. We are assisted also by this Sense in acquiring an

The Senses and proper Instruments of Service in examining Disorders.

^a Lib. V. Cap. 26.

^b Ibidem.

easier Knowledge of a Caries of the Bones, an ulcerated Cancer, and Disorders of this sort, which carry with them a peculiar Smell. If, therefore, the Surgeon has these Faculties in Perfection, Seeing, Feeling, Hearing, and Smelling; with the proper Exercise of these, and the Assistance of Instruments, he will seldom be at a loss in discovering the Disorder.

And Reason
itself.

LII. But Cases in Surgery sometimes happen, where the external Senses, assisted by Instruments, will by no means yield sufficient Light to their Discovery; but *Reason* and *Judgment* are also required: the true Nature of a Disease is traced by Reasoning upon its various Symptoms. HIPPOCRATES, the common Parent of Physic, seems to have regarded this, when he said ^a, whatever escapes the Reach of our external Sight, should be searched for and overtaken by the Eyes of the Mind. So when any one has had a violent *Concussion of the Brain*, from a Fall or a Blow, without receiving any external Hurt, he will lay senseless, as if he were in a profound Sleep; Reason in this case will easily inform us, that there is an Extravasation of Blood in the Cavity of the Cranium, and that proper Methods must instantly be used to make a Passage for it externally. Our Reason is of equal Service to us in an *Empyema*; for tho' in this case Matter is formed in the Cavity of the Thorax, from a previous Inflammation of some of its Contents, yet we shall meet with great Difficulty in discovering this to be the case, by our external Senses; but by comparing the present Symptoms with the Disorder that was previous to them, we find it necessary to treat the Case as an *Empyema*; and of this kind there are many Instances.

Of the ne-
cessary Ap-
paratus for
Dressings.

LIII. We are next to treat of what principally belongs to the Method of dressing the disordered Parts. In this place we are first to speak of ^b *Lint*, which is the Scrapings of fine Linen, by the *French* called *Charpie*. This may be made into various Forms, which acquire a different Name, according to the difference of their Figure; those that approach nearest to an oval or orbicular Form are called *Pledgits*, (by the *French*, *Plumaceau*) see Table II. Letters A and B. Lint made into a Cylindrical Form, or resembling the Shape of Dates or Olive Stones, is called a *Dossil* (in *French*, *Bourdonets*); their size is very different, as appears from the Figures at C D E. Sometimes they are secured by a Thread tied round their Middle, as it is expressed by the Figures at the Letters F G. It requires a good deal of Time and Experience, to acquire a proper Expertness in making up these Forms.

Uses of scraped
Lint.

LIV. These different Forms of scraped Lint, especially the cylindrical, are required for many Purposes; for they are applied, 1st, To stop Blood in fresh Wounds, by filling them up with dry Lint before you apply the Bandage; but if you have not scraped Lint at hand, you may tear a fine piece of Linen into small Rags, and apply it in the same manner, and perhaps with a better Effect; but in very large Hæmorrhages they should first be dipt in some Styptic Liquor, Alcohol, or Oil of Turpentine; or sprinkled with a Styptic Powder; but of this we shall presently treat more largely. 2^{dly}, To agglutinate and heal Wounds, to which end scraped Lint is very serviceable; if it is spread with some digestive Ointment or Balsam, or dipt in some vulnerary Liquor, they also yield us great Assistance. They are often serviceable, 3^{dly}. In drying up Wounds and Ulcers, and forwarding the Formation of the Cicatrix. They are used

^a In Lib. de Arte.

^b CELSUS, Lib. V. Cap. 26. Num. 21.

also with Success, 4^{thly}, *In keeping the Lips of Wounds at a proper Distance*, that they may not hastily unite, before the Bottom is well digested and healed. 5^{thly}, and lastly, They are highly necessary *to preserve Wounds from the Injuries of the Air*. The small portions of Lint that are tied round with a Thread (see *Tab. II. Letter F and G*) are chiefly used in dressing Wounds and Ulcers that are of the deeper kind, and are always applied to the Bottom of such Wounds, the remaining Cavity being filled up with other Portions of Lint, not supplied with a Thread, and by this means we do not only provide for the immediate Removal of these Dressings, when we shall think it necessary, but at the same time prevent a Possibility of leaving any Part of them concealed in the Bottom of the Wound. In very large Wounds, and especially in Amputations of the larger Limbs, which Operations are frequently required in the Army and Navy, at times when Lint is very scarce, it will be sufficient to dress the bare Bone and Face of the Wound with scraped Lint, filling up the Cavity with *Tow*, covering all with a large *Compress*; Figures of which you will see at the *Letters H and I, Plate II.* The Surgeons in former Ages formed *Compresses* of Sponge, Feathers, Wool, or Cotton, Linen being a scarce Commodity with them; but Lint is far preferable to all these, and is at present universally used; excepting, that in Wounds of the Thorax or Abdomen, the use of a Sponge may sometimes be necessary to suck up the Blood spilt in those Cavities.

LV. Besides the different Forms of Lint that we have described, there remains another, which is sometimes used in dressing of Wounds, called *Tents*, made of Lint worked into the shape of a Nail, with a broad flat Head; they differ in Thickness and Length according to the Size of the Wound for which they are intended, as appears by the Figures in *Plate II, at the Letters KLMN.* These Tents are chiefly used in deep Wounds and Ulcers. They are of Service, 1. Not only in conveying Medicines to the inmost Recesses and Sinuses of the Wound; but, 2. To prevent the Lips of the Wound from uniting before it is healed from the Bottom; to which we may add, 3. That by their Assistance grumous Blood, Sordes, &c. are readily evacuated. They are to be made extremely soft, that the Cure of the Wound may not be retarded by the Pain they would otherwise bring on: but that the Wound may not be kept too long, I would advise the Surgeon, as soon as he has cleansed the Part sufficiently, and finds the Sinuses heal up, to lessen the size of his Tents by degrees, and, as soon as he can conveniently, entirely to lay them aside. I am not at all surprized, that many Surgeons of good name, (amongst which are CÆSAR MAGATUS, BELLOSTE, and others) have entirely forbid the use of Tents; since to be sure it proceeded from a total neglect of this caution in their use, amongst too many of their Brethren.

LVI. But there is another kind of Tents, differing from that which we just now described, made of Linen Rags, not scraped, worked up into a Conical Form, to the Basis of which is fastened a strong Thread; the Apex of it must be a little unravelled to make it softer, that it may not become painful. The Thread is fastened to the Basis that it may be recovered with the greater Ease, if by any Accident it should be forced into the Cavity of the Thorax or Abdomen (*See Plate II, Fig. O.*); for it is to be observed here, that the Tents we now describe, are chiefly used to keep open Wounds that penetrate into the

Cavity of the Thorax or Abdomen, in order to make way for the proper Discharge of Blood, Matter, &c.

Of Spongy
Tents.

LVII. A third sort of Tents remains to be described, whose principal Office is, not only to keep open, but to enlarge by degrees the Mouth of any Wound or Ulcer, which shall be thought too strait, that by this Means a freer Passage may be procured for the Blood and Matter that was confined, and that proper Medicines may find a more ready Admittance. These Tents are made either of *Sponge*, prepared in a certain Manner, or of dried *Roots of Gentian, Calamus Aromaticus, &c.* for these kind of things imbibe the Matter that flows to them, and being presently enlarged, dilate the Lips of the Wound. Not much unlike Tents, are the small *Silver or Leaden Tubes*, which are frequently used to draw off Blood, Matter, or Water from Wounds or Ulcers of the smallest Orifices; sometimes in extracting Water from dropical Patients, or evacuating the Urine in a puncture of the Bladder: They are made of all Sizes and Shapes, as you may see in *Plate II, at the Letters P Q R S T V X*. What farther concerns the Use of these Tubes, you will see more largely treated of, when we shall describe the Disorders that more immediately call for their Assistance.

Of Plasters.

LVIII. Your Apparatus for Dressings will be very deficient if you are not furnished with *Plasters*. The meaning of the Term is so well known, that I should appear ridiculous if I went about to explain it. But there are different Kinds of Plasters without number; the principal of these, and the manner of making them, may be learnt from various Books, as particularly, the *Augustan Dispensatory*, the *London*, the *Prussian*, and that of *Lemery*. These Plasters are spread upon Linen or Leather, according to the different Circumstances of the Wound, Place, or Patient. If the Part upon which the Plaster is to be laid is naturally hairy, it must be shaved; that it may stick the closer, and be removed without pain to the Patient: But for the better Application to different Parts of the Body, the natural Shape of the Part must be consulted, and the Plaster formed accordingly: Therefore some Plasters assume a Round, Square, Triangular, Elliptical, or Lunar Form; others the Shape of the Letter T, &c. as will clearly appear at *Plate II, Numb. 1, 2, 3, 4, 5, 6, 7, 8*. Others there are which are divided at one or both Ends, *See Numb. 9, and 10*. To these we may add those kind of Plasters which are perforated near the Middle, some with a single, some a double Perforation, which are of frequent Use in Fractures attended with a Wound; for by this Contrivance the Wound may be cleansed and dressed without removing the Plaster, *See Number 11*. Such Plasters are used too, especially those with the single Perforation, in making Issues or removing Warts and other Excrescencies, by corrosive Medicines.

The Size
and Use of
Plasters.

LIX. The *Size*, as well as Form of Plasters, is very various, since it must always correspond with the Part which is bruised or wounded. Their *Use* also is of great Advantage in defending Wounds and Ulcers from the external Air, or from any Filth which they might otherwise contract; for they are not only serviceable in securing the Dressings, but they also forward the Maturation of the *Pus*, agglutinate and heal Wounds, unite broken Bones, heal Burns, assuage Pain; and, lastly, strengthen the weaker Parts.

LX. It

LX. It is frequently the Custom, after the Plaster and other Dressings are applied, to cover all with a *Compress*, which is made of the softest old Linen, of Com-
presses. four, six, or eight times doubled, without Seam or Hem; these are of service, not only by preserving the Parts more safe from the Injuries of the external Air, but also for the better securing and fixing the Plasters and other Dressings. Compresses are also frequently applied, where no Plaster is made use of, and that, sometimes dry, sometimes wetted with certain Liquors, which are supposed to be strengthening, resolving, lenient, emollient, or cooling; they are frequently dipped in Decoctions of certain Herbs, into Wine, Spirit of Wine, Water, Vinegar, or Oxycrate, and sometimes into Lime Water; and these are either administered cold or hot, as the Circumstances of the Case shall require. The antient Physicians called them *Splenia*, from their Shape, frequently resembling the Spleen.

LXI. When you come to enquire after the *Figure and Size of Compresses*, you will find as great variety as you did amongst Plasters; many of them are *Square*, The Shape
and Size of
Compresses. (See Plate II. N. 12.) others are *Oblong*, and not unlike the Spleen, N. 13.) again, others *Triangular*, (N. 14.) others resemble the Form of a *Cross*, (N. 15. according to their Situation, some are called *Strait*, others *Oblique*, others *Transverse*, others *Annular*, as when they surround the Arm, or Foot. There are others again in the Form of an *Asterism*, (N. 16.) some are divided either on one or on both Sides, as far as the Middle, (N. 17, 18.) sometimes they form a *Hexagon*, (N. 19.) or are *Round*, or *Globular*, resembling a Ball; these are used in Luxations of the *Os Humeri*, and are placed under the *Axilla*, (N. 20.) sometimes Compresses of a much smaller Size are required, which are either *Square*, (N. 21.) and are used in Wounds of the Blood-vessels, to restrain Hæmorrhages, or *Taper*; (N. 22.) when they are called for in Sutures of Wounds, or in Ligatures of the Arteries. But all of them, of what Shape soever, should be something larger than the Plasters they are designed to cover.

LXII. Compresses of all Kinds are intended for these Purposes; 1. To preserve and cherish the natural Heat of the Body. 2. To secure the Dressings Use of Com-
presses. that lie under them. 3. To convey liquid Remedies to Parts wounded, or otherwise disordered, and to prolong the Use of them. 4. To fill up any Cavities or Depressions of the Parts, that the Dressings, (especially in Fractures) may be applied with greater Security. 5. To prevent Bandages from bringing on a troublesome Itching, or other Pain or Uneasiness upon the Skin. And lastly, 6. to stop Hæmorrhages.

LXIII. But it is now high Time to speak of *Bandages*, since they are so necessary a Part of the *Apparatus* in dressing and binding up of Wounds. Of Ban-
dages. They are not only of greater Service than Compresses and Plasters in securing the other Dressings, but are also of excellent Use in restraining dangerous Hæmorrhages, and in joining fractured or dislocated Bones. Though I have set aside the third and last Part of this Work purely for the Description of Bandages, where you will find them more fully and accurately treated, I thought it nevertheless necessary to touch slightly upon these things that are principally necessary to a Surgeon, by way of Introduction.

LXIV. Almost all Bandages, that are used in Dressings of Wounds, Ulcers, fractured or dislocated Bones, should be made of clean Linen Cloth, softened by Wearing, but strong. They should be of a proper Length and Breadth; and, Of what
Materials
they are to
be formed. that it may be the stronger, examine the Course of the Threads, and tear the Cloth

Cloth lengthways; Darns, Seams, and large Hems in the Linen should be avoided as much as possible, that no Inconvenience may be brought on by the Roughness and Irregularity of the Rowler. The proper Size of Bandages we shall describe more fully below.

Some Sorts
of Bandages
described.

LXV. There are different Sorts of *Bandages* for different Uses. Some are *common*, others *proper*; these are only applied to particular Parts, those may be applied to any Part. So we may distinguish them into *simple* and *compound*; the *simple* are those that are formed of one intire Piece of Linen, the *compound* of several Pieces of Linen sewed together in different Manners. The most simple of all is not rolled up, and is the Bandage used in Phlebotomy, See *Letter a*, *Plate II*. That at *Lett. b*, seems next to this, which is rolled up at one End, and is from thence called the *single-headed Bandage*, as those are called *double-headed* which are rolled up at both Ends, See *Plate II*, *Letter c*. Next to these come other Bandages which are made out of one Piece of Linen, but divided at both Ends almost as far as the Middle, See *Plate II*, *Lett. d*. These are called by the Surgeons *four-headed Bandages*. The Bandage at *Letter e* is somewhat shorter and narrower, and is divided at one End, and perforated at the other; this is generally used in Dressings that are applied to the Penis, or one of the Fingers. The *Letter f* describes a double-headed Bandage, divided about the Middle, which is called the *uniting Bandage*, from its Use, for it serves to unite Wounds that are made lengthways, without Suture. The *scapular Bandage*, which (as appears at *Letter g*) is provided in the Middle with an opening, through which the Head may easily be passed, the extreme Parts of the Bandage hanging one over the Breast, the other over the Back. The chief use of this Bandage consists in this, that in dressing Wounds of the *Thorax* or *Abdomen*, it is capable of supporting another Bandage that is somewhat wider, made of a Cloth four or six Times doubled, and bound round the Breast or Belly; as will appear more clearly from what you will read below.

Of the T
Bandage of
Heliodorus.

LXVI. There remains still to be described a compound Bandage, made of two Pieces of Cloth, almost in the form of the Letter T, as you see it described at *Letter h*; its upper Part is brought round the Belly and fastened by a Knot, but the lower Part passes under the Body between the Thighs, and being brought up again, is fastened to the upper Part upon the Back. These Bandages plainly appear to be designed for the Security of such Dressings as shall be thought proper to be applied to the *Anus*, or *Parts of Generation*. Some, from the Inventor, call it *Heliodorus's Bandage*; from its Shape it is called the *T Bandage*; and sometimes, from the Division that is frequently made in the lower part of it, it is called the *double T*.

The Explanation of the Second Plate, which exhibits those Things which are principally required in Dressings, taken chiefly from Dionis.

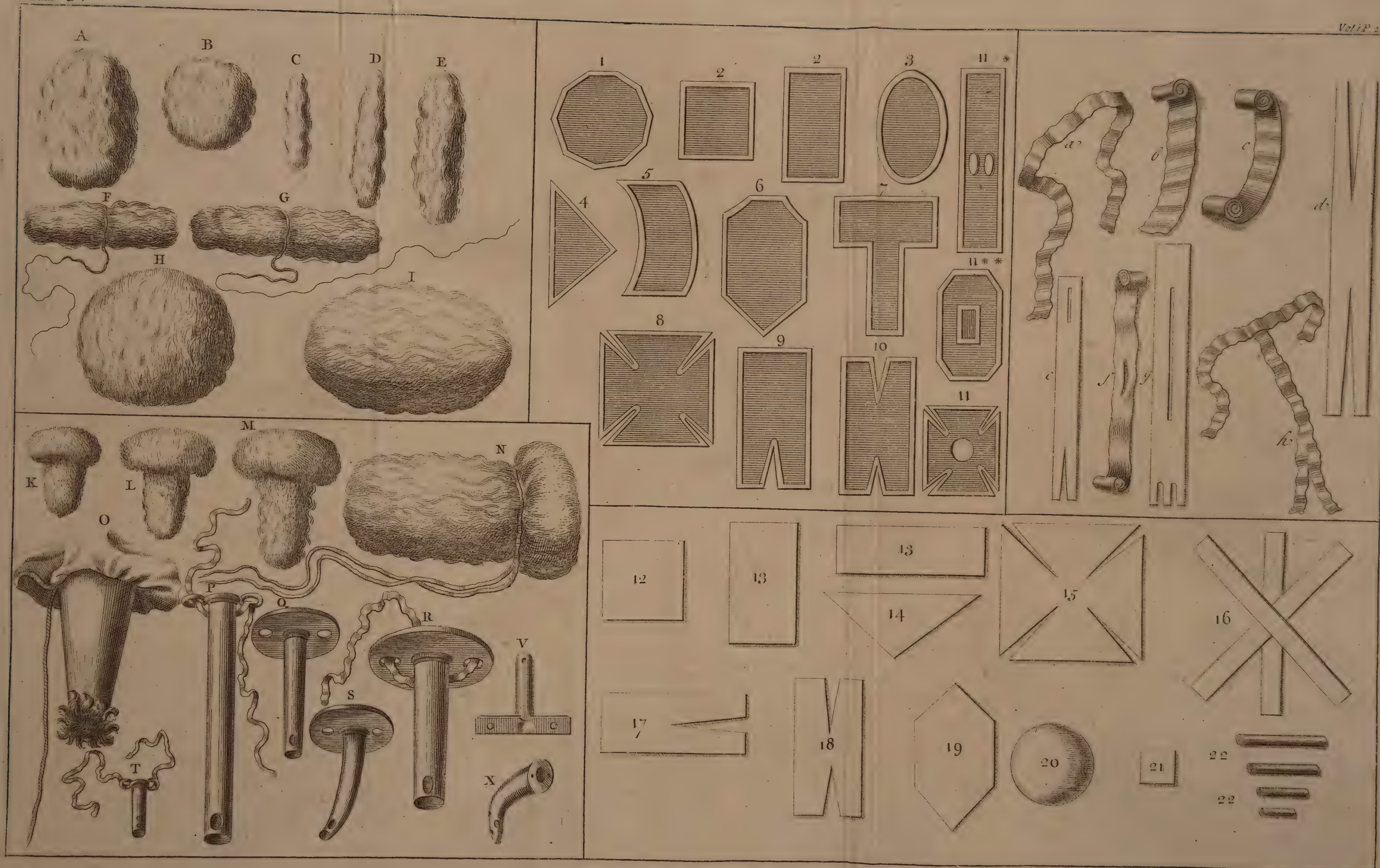
1. Of Pledgits, Tents and Compresses.

A and B, *Scraped Lint*, commonly called *Pledgits*, of an orbicular or oval Figure.

C D E, *Dossils*, which are composed of Lint, worked into the Likeness of Olives, or Dactyle Stones.

F and G, the same, with the Addition of a Thread tied round them.

H and I,



H and I, *larger Pledgils* made of Tow.

K L M, represent *Tents* of different Sizes made of Lint.

N, shews you a very large *Tent*, with a Thread annexed to it.

O, a *Conical Tent*, still larger than the former, made also of Lint.

P Q R S T V X, *Tubes* of different Kinds made of Silver or Lead.

Number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. different Forms of *Plasters*.

Num. 12, 13, 14, 15, 16, 17, 18, 19. different Sorts of *Compresses*.

Num. 19. three Sorts of *Compresses*, resembling the Form of an Asterism.

Num. 20. Balls of Lint, which are sometimes used as *Compresses*.

Num. 21. A small square *Compress*.

Num. 22. Several small slender *Compresses*.

Of Bandages.

a, A simple *Bandage*, not rolled up.

b, A *Bandage* of one Head; that is, rolled up at one end.

c, A *double-headed Bandage*, rolled up at both ends.

d, A *four-headed Bandage*.

e, A small *Bandage*, particularly intended for the Security of Dressings that are applied to one of the Fingers, or the Penis.

f, The *uniting Bandage*, which is perforated in the Middle.

g, The *Scapular Bandage*.

h, *Heliodorus's*, or the T *Bandage*.

LXVII. Though Surgeons have formerly invented different Kinds of Bandages, for every Wound that could be inflicted upon the Head; yet there is but one Form that seems necessary, and that will answer every End that can be proposed from this kind of Application. This is made in the following Manner: Take a Handkerchief, Napkin, or any square Piece of Linen, double it up in a triangular Form, and apply it, as we frequently do in hot Weather, when we lay aside the usual Coverings of the Head, to moderate the excessive Heat of the Sun. The Bandage which is so much in Use amongst the modern Surgeons, called by the *French*, *Le grand courechef*, differs very little from this, and is commonly made of a Napkin, or some soft Piece of Linen, in a square Form. It is doubled in such a Manner, that the lower Part is about four Fingers Breadth wider than the upper; the middle Part of this Cloth is placed so upon the Head, that the fore Part may reach almost as far as the Eyes, the four Extremities or Corners of it hanging over the Cheeks. The two Corners of the upper or narrower Part are to be tied under the Chin, at the same Time the Corners of the lower or wider Part are to be brought towards the back Part of the Head, and tied together, or fastened with a Needle and Thread. The fore Part that was extended towards the Eyes, is turned back as far as the Crown of the Head; the two Parts that hang over the Neck almost to the Shoulders are also to be turned back, and fastened behind the Ears with a Needle and Thread. This kind of Bandage, when it is neatly made, sticks close to the Head, and is an excellent Contrivance to preserve it from the Injuries it might receive from cold Air; for which reason it is at present in great Use and Esteem. You may in some Measure form an Idea of the Appearance it makes upon the Head by consulting *Plate III, Fig. 1, Letter A.*

The most common Bandage for the Head.

But

But the Method of applying it must be learnt from some skilful Artist; for it will easily appear, from this one Instance, how difficult it is to describe the Art of applying Bandages, by Words, and how impossible it is to learn it from such Descriptions.

Application
of the Scapu-
lar Bandage.

LXVIII. *Letter B, Plate III, Fig. 1*, describes a Bandage which is generally used to secure Compresses and other Dressings that are applied to the Breast or Belly. The manner of preparing this Bandage is described above at *Sett. 65*; therefore in this Place it remains only to shew the most convenient Method of applying it. After the Wound is dressed, take a double Cloth, and wrap it round the Abdomen or Thorax, sewing not only the Ends of the Cloth strongly together, but fastening it also in the same Manner to the Extremities of the Scapular Bandage, to prevent it from slipping down; the Manner in which it is done appears very plainly in *Plate III, Fig. 1, Lett. B and C*.

The Ban-
dage for
Phlebotomy.

LXIX. The *Letter D* shews the Bandage or Ligature that is used to Veins of the Arm; *E*, to those of the Foot; but we shall treat more largely of the Manner of preparing and applying them in the third Part of our Chirurgical Institutions.

Names of the
most simple
Windings of
the Bandage.

LXX. We have this farther to add, concerning simple Bandages; they assume different Names, according to the different Windings that they form in the Manner of applying them: For instance, if a simple Bandage with one Head surrounds an injured Part with one direct Course, it is called *annular*, *orbicular*, or *circular*. On the contrary, if the Windings of the Bandage ascend or descend equally in a spiral Manner, they are called *obtusè* or *spiral*; this frequently happens in Fractures, and other Kinds of Disorders, and is of very eminent Service. But when the Limbs which are to be bound in this Manner are of different Thicknesses in different Parts of them, which is the Case of the *Tibiæ*, it requires a good deal of Art to prevent the Windings of the Bandage from hanging loose. The Bandage is to be applied to the *Tarsus*, and to be brought upwards so as to cross the *Malleoli*, rolling it round the *Tibiæ* in a spiral Manner; but when you are come up to the Calves of the Legs, each round of the Roller must be turned in a particular Manner, and tightened according as the Case requires. It is much easier to communicate this Manner of turning in the Roller at each Round, than to describe it in Words. Consult in this Place *Plate III, Fig. 1, Lett. F*. But from what has been said, you will easily conceive the Reason why the Windings of the Bandages that we have been describing, are generally said to be inverted, and by the *French* are called *Renversées*. These Bandages are so managed that the Windings of the Roller are contiguous to each other; but there is another Method of rolling in Use, where the Windings of the Bandage are not so frequent, and keep a greater distance from each other, and are therefore called *creeping Bandages*, in the *French Schools Rempans*; an Example of which you may see in the left Arm of the last mentioned Figure, at *Letter G*. These creeping or serpentine Bandages are used to secure Compresses, Fomentations, or Cataplasms upon a diseased Part. Lastly, there are Bandages called by the Surgeons, *Containing, Uniting, Dividing, or Expelling*, from their several Uses and Intentions.

Where the
Bandage
ought to be-
gin and end.

LXXI. But lest any one should be ignorant of the neatest and most proper Way of applying these Bandages, you are diligently to observe what follows; to wit, when the Arm is to be dressed, the beginning is formed by two or three circular

circular Windings on the Wrist, ascending by loose Spires to the Cubit or Shoulder as the Case shall require ; but when the beginning is to be on the Foot, it is to be formed by three or four circular Windings of the Bandage round the *Tarsus* and *Metatarsus*, then proceeding in a serpentine Course up to the Knee, or, if the Case requires it, up to the Head of the Thigh, and then, as it sometimes happens, descending again. But we should not neglect to mention in this Place, that the beginning of the Bandage is sometimes applied even to the diseased Part, as in several Kinds of Fractures ; sometimes near it, above it ; or below it, and sometimes at a great distance from it, according to the Disposition of the Wound. On the contrary, the Extremity of the Bandage is scarce ever fastened upon the diseased Part, but rather upon a sound one, to avoid giving Pain^a. Upon the whole, we must inculcate this general Admonition ; that, whatever the Case be, whether Wound, Fracture, Luxation, or Amputation, your Bandage be neither too loose, nor too tight ; for loose Bandages do not confine the Parts enough : and, when they are too tight, they may cause not only violent Pains, but Inflammations, Tumors, Gangrene, and Mortification.

LXXII. The necessary Apparatus for Dressings seems by no means complete without *Ligatures*, *Chords*, *Bands*, and *Strings*, and these of different sorts, some fine, others coarse, strong, made either of Flax, or Hemp, or Cloth, or Silk, or Horse-hair, according to the nature of the Disorder ; for these things are almost constantly required. We use them to replace, or extend Bones that are broken or dislocated, to tie the Patients down, in Lithotomy, Amputations, and Operations of that kind ; to tie up the Veins in Phlebotomy, to tie up Arteries after Amputations, or in large Wounds ; to secure the Splints that are applied to Fractures ; to tie up the Processes of the Peritoneum with the Spermatic Vessels in Castration ; and lastly, in taking off Warts and other Excrescences by Ligature, and in all other Operations of this kind, as we shall more fully explain below.

LXXIII. What we have already said concerning the Qualifications which every Surgeon ought to be indued with, and of the Instruments with which it is necessary for him to be furnished, is sufficient for this place, by way of Introduction to the following Work. We may evidently draw this conclusion from the foregoing Discourse, that Surgery is no easy Art, but affords a large Field for Enquiry, and is not to be attained without great Assiduity and Labour. The Surgeon has not only a vast number of Disorders to encounter, but the means by which every kind of Disorder is to be subdued are almost infinite, the particular nature of which must be known to the greatest Exactness. But I by no means discourage any one from these Studies by the Difficulties that I here speak of, for there is nothing, according to the old Proverb, but what is to be overcome by Industry. I would rather advise Students in Surgery to have the most famous of the Ancients in this Art always in their eye ; and to consider that we not only enjoy all the Advantages they had, but far greater ; for we have been so largely assisted by the Inventions of ingenious Men in these latter days, that if we equal our Ancestors in Industry, we shall easily exceed them in Skill.

LXXIV. But altho' the Attainment of Surgery had been still more difficult than it is, yet as we do not enquire into the Difficulties, but the Honours and Uses that attend the Acquisition of an Art or Science, before we make choice of it ; this is so far from being a Discouragement to generous Minds, that it is rather an Incitement to their Industry. That Surgery is extremely necessary for

^a See CELSUS, Book V. Chap. 26. Number 24.

the Preservation of Life, does not only appear from what we have already laid down, but from the Necessity the Physicians frequently lye under of calling for the assistance of this Art, not only in external Disorders (to which some would impertinently confine Surgery) but in internal Complaints also, where Medicines, and a proper Diet, are in no wise equal to the Cure, as is the Cataract, Stone in the Bladder, Empyema, Dropsy, Suppression of Urine, difficult Births, and an infinite Number of other Cases; in which they are often obliged to fly to Surgery, as their sole Anchor; as appears from the Testimony of the great HIPPOCRATES^a. Amongst the great numbers that have been Scoffers and Deriders of Physic, there have been very few so hardy as to reject Surgery as an useless Art; for indeed he must be entirely given up to Impudence and Folly that would pretend this to be an useless Art, by whose Assistance the most grievous Disorders that the Body is subject to are relieved; to wit, Wounds, and the Loss of Blood that is consequent upon them, Fractures or Luxations of the Bones, Stones in the Bladder, Suppression of Urine, and an infinite Number of others.

Surgery the
most certain
part of Phy-
sic.

LXXV. I would have no one be surprized at the Assertion, that Surgery surpasses all other Branches of Physic in point of Certainty; what CELSUS said formerly upon this Occasion is very true^b, “The Effects of Surgery are more
“ evident than those of any other Branch of Physic, since in many Diseases, (the
“ internal especially) Nature or Accident may do much, and the same Me-
“ dicines have sometimes a good Effect, and sometimes no Effect at all, so
“ that it becomes Matter of Doubt, whether Health be the Effect of the Me-
“ dicines that have been administred, or of a good natural Constitution of the
“ Body; but in Disorders that are relieved by the Assistance of the Hand, it
“ is very evident from whence the good Effect proceeds.” Whatever good Effects we produce by stopping violent Hæmorrhages, by taking off Tumors and Excrescences, by curing Herniæ, by cutting for the Stone, by couching Cataracts, by drawing forth suppressed Urine, by changing the cross Position of the Infant in the Womb, and bringing it into the World, by setting broken Bones, and reducing luxated ones, and by relieving other Disorders of this Sort; for all this we are evidently obliged to the Hand of the skilful Surgeon.

Students in
Surgery in-
cited to In-
dustry.

LXXVI. Having premised this by way of Introduction, we cannot avoid again and again exciting all Students of this most noble Art to Diligence and Industry, and not to rest satisfied with being able to shave, spread a Plaster, or open a Vein; for I would have them know, that not only a good natural Sagacity, but great Labour and Study also, are absolutely required to qualify a Man for so great a Trust as that of taking care of the Health of Mankind. Students in Surgery should not only be furnished with Strength of Body, but Constancy of Mind also, that they may remain unmolested and unmoved by the Fœtch, Blood, Pus, and Nastiness that will naturally occur to them in their Practice. They should consider, that by frequent Exercise these Things will become customary to them, and they will acquire, as it were, a second Nature. And a Surgeon should submit to the greatest Inconveniencies, rather than neglect any thing that might be for the Benefit of his Patient; for then he will have performed his Duty properly, and have satisfied his own Conscience, when he has done every thing that comes within the Compass of his Art for the Service of his Patient.

^a Sect. 8. Aph. 6.

^b See Lib. VIII. Præfat. and HIPPOCRATES de Arte, V.

INSTITUTIONS

OF

SURGERY.

PART the FIRST.

Of the Five Kinds of Disorders of the Body.

BOOK the FIRST.

OF WOUNDS.

CHAP. I.

Of WOUNDS in general.

I. **W**E were persuaded by two Reasons to begin these Institutions of ^{A Wound,} Surgery, with an Enquiry into the Nature of Wounds; for ^{what.} Wounds are not only more common than any other external Injuries, but the Nature of them also is more easily explained in our Schools of Surgery. And indeed when we are thoroughly acquainted with the Nature of a Wound, we shall with much greater Ease and Clearness comprehend all the other Doctrines of Surgery. What a *Wound* is, the most unskilful are acquainted with; but it is frequently defined to be a *violent Solution of the Continuity of the soft external Parts of the Body, made by some Instruments, whether sharp or obtuse.* Others take a greater Latitude in defining it, and call every external Hurt of the Body, by what Cause soever produced, a *Wound*. For Instance, they reckon violent Strokes upon the Head, Thorax, or Abdomen, under the Title of Wounds, though no external Parts are divided, as will easily appear from what we shall say below, when we come to treat of mortal Wounds.

II. On the other hand, some are of Opinion, that unless the injured ^{Differences} Parts of ^{of Wounds} the Body are divided by some sharp Instrument, as by a Sword or Knife, it is ^{in relation to} by no means to be called a Wound; though it plainly appears, from what has ^{the inflicting} been already said, that those Injuries which are produced by blunt Instruments, ^{Instrument.} may properly enough be called Wounds; under this Head are Gun-shot Wounds, Wounds inflicted by Stones, Clubs, or that come by violent Falls: Therefore we may constitute two Differences of Wounds; the one made by *acute*, the other by *blunt Instruments*.

On what
Parts of
the Body
Wounds are
inflicted.

III. Wounds are generally inflicted upon the *softer Parts of the Human Body*, such as the Skin, Fat, Muscular Flesh, Ligaments, Blood-vessels, and Nerves, and Parts that are composed of these, as the Viscera and Intestines; but whilst we are asserting this, we must by no means entirely exclude *the more solid Parts of the Body, as the Bones*; since the Bones themselves afford frequent Examples of Injuries received from sharp Instruments. The Parts, therefore, that are subject to these Injuries will afford us two Distinctions of Wounds; one, *Wounds of the soft Parts*; the other, *Wounds of the Bones*.

Causes of
Wounds.

IV. As *Causes of Wounds*, all Instruments of what kind soever, whether blunt or sharp, may properly be reckoned, provided they are of such a Nature, that, upon the violent external Application of them, they are capable of producing a Solution of Continuity in the Parts of the Body upon which they are inflicted: For a Solution of the external Parts from an internal Cause is not called a Wound, but rather an *Abscess*, or *Ulcer*. So when the harder Parts of the Body, to wit, the Bones, are broken by a Fall, or by a violent Blow received from a blunt Instrument, we do not call that a Wound, but a *Fracture*.

Effects of
Wounds.

V. *The Effects which are produced by Wounds*, besides the Division of the softer Parts, are generally *Profusions of Blood*, though they are sometimes attended with much greater Mischiefs than these: For it can scarcely happen, but that the divided Parts must in some measure, if not totally, lose their natural Functions, according to the different Uses for which the Part is intended, and according to the different Degree of Injury that it receives. The greater Number of Uses a Part is intended for by Nature, the worse will be the Consequence of a Wound upon that Part. This Principle is so extensive, that we are always guided by it in forming our Prognostic, whether the Wound will prove mortal or not. He therefore that is best skilled in Anatomy, that is best instructed in the Situation of Parts, and their Uses, will be enabled to form the most accurate Judgment of the Consequences that will necessarily attend a Wound upon any particular Part.

Different
sorts of
Wounds.

VI. What we have taught of the different Situations and Causes of Wounds, sufficiently demonstrates, that there are many different kinds of Wounds: some are brought on by *Puncture*, some by a *Stab*, and some again by a *Blow*: some are *curable*, others *incurable*: some are made with *sharp Instruments*, others with *blunt* ones: To which Class may be referred all Gun-shot Wounds, all that are occasioned by a Blow, or a Fall, and which the Surgeons distinguish by the Name of Contusions. With regard to their *Figure*, some form a *right Line*, others are *curve*, *transverse*, or *oblique*: with respect to their *Situation*, some are seated in the *Head*, others in the *Neck*, *Thorax*, or *Abdomen*; and of these, some are *external*, others *internal*. Variety of different kinds of Wounds arise from the great diversity of Condition that Wounds are left in: For in some Wounds the inflicting Instrument, or Part of it, remains; for instance, a Lead Bullet, a Piece of Glass, or of a Grenade, the Points of Swords or Arrows: But in some Wounds nothing of this kind is left. Sometimes *Fractures of the Bones* accompany Wounds, which we almost always find to be the Case in Wounds of the Head, and in Gun-shot Wounds. Some Wounds also are attended with Poison, as those which are made with poisoned Arrows, or other Instruments. Under this Head we may very properly rank the Bites of Animals, but more particularly of mad or venomous Animals. Some are of Opinion, that

that Wounds which are made with Copper or Silver Instruments should be reckoned in this Class, the Poison of which, if there is any, is owing to the Vitriol that is mixed with these Metals.

VII. In *slight Wounds*, that is to say, where no considerable Vein, Artery, Nerve or Tendon is concerned, you will usually remark the following *Appearances*: At first sight, the Wound appears to us as a red Line drawn upon the Part, but upon being dilated the Blood instantly gushes out, in greater or smaller Quantities, in Proportion to the Size and Number of the Blood-vessels that are injured. The Hæmorrhage, after a short Continuance, stops of its own accord, or by some external Application, and the Blood concreting in the Wound, forms a Crust: The Lips of the Wound now begin to look red, and swell, and are attended with some Degree of Pain and Inflammation. If it is a large Wound, a Fever, that is to say, an universal Heat and Quickness of Pulse almost always ensues. Upon the third or fourth Day, sooner or later, a whitish glutinous Humour, not unlike white Oil, appears; and this is known to the Surgeons by the Name of *Pus*, or *Matter*. Upon the Appearance of Matter, the Redness, Tumor, Pain, Inflammation, and Fever disappear entirely, or at least are sensibly abated; and these are the Signs of a Wound inclining to heal: For under the Matter we have described, new Flesh springs up from the wounded Vessels, which having by Degrees filled the Wounds, dries upon its upper Part, and forms a *Cicatrix*.

What appears after a slight Wound,

VIII. In *dangerous Wounds*, that is, where any considerable Blood-vessel is wounded or divided, there generally ensues so violent an *Hæmorrhage*, that the wounded Person is an instant sensible of great loss of Spirits, and Weakness, and faints away; and when the larger Arteries are wounded, whether they are internal or external, he dies upon the Spot. Although somewhat less Danger is apprehended from Wounds that are inflicted upon the Vessels, which are situated upon the external Parts of the Body (some few excepted) because they will admit of the Ligature, and other Means for restraining the Violence of the Hæmorrhage: Nevertheless it is almost impossible to prevent the Limbs which lie below the Division of the Artery, and are used to receive their Nourishment by that Channel, from becoming paralytic; nay, sometimes, from mortifying. This is almost constantly the Case when the Trunk of the Brachial or Crural Artery is divided.

What after dangerous Wounds,

IX. The Consequences we have just related, follow upon the total Division of a considerable Vein or Artery: It remains now that we consider what will follow upon a partial Division of them. Whenever a large Artery is wounded, and not entirely divided, the wounded Fibres instantly contract themselves; by this Means they dilate the Orifice of the Wound, and render it difficult to stop the Flux of Blood; and though the Hæmorrhage be stopped for a little Time, yet it will burst out again on a sudden violently, or at least produce a dangerous Tumor, called an *Aneurism*. This will frequently be the Case, when only the external Coat of the Artery is wounded: For by this Means the internal Coat of the Artery is left to sustain the whole *Impetus* of the Pulse, which being unequal to, it is forced by Degrees into a Tumor like a Bag, whence frequently ensue the most calamitous Consequences. But of this Case we shall treat more fully in another Part of this Work.

What follows the partial Division of a Blood-vessel.

X. Upon

Consequences following from a wounded Nerve.

X. Upon the *Division of a Nerve*, the Limb to which that Nerve was extended becomes instantly rigid, void of Sensation, and withers; so it is no wonder that a Man instantly expires upon the Division of those Nerves that are sent to the Heart, or *Diaphragm*. A Wound also is attended with great Danger, where the Nerve is only partially wounded, and not entirely divided; for the wounded Fibres contract themselves, and those that remain undivided suffer too great Extension, which will bring on most violent Pain, Spasms, Convulsions, Inflammations and Gangrenes, and sometimes Death itself.

Consequences of a wounded Tendon.

XI. When a *Tendon is wounded or divided*, the Part to which it belongs loses its Motion; but if it is divided only in Part, it will produce much the same Symptoms with a Nerve in the same Circumstances. The consequence of Wounds upon the internal Parts, you will find more fully explained when we come to treat of the *Diagnosis* and *Prognosis* of Wounds.

Of the *Diagnosis* of Wounds in general.

XII. The *Diagnosis* of Wounds is for the most Part extremely easy, for the Size, Situation, and Nature of the Wound, generally lies open to the Sight. Nevertheless there are some Cases that are not very uncommon, where it is somewhat difficult to discover the true Nature of the Wound. But in order to make the more easy Discovery, whether the Wound is deep or superficial, whether any of the internal Parts are wounded or not, the Surgeon should always be careful upon the first Visit to clean the wounded Part with a Sponge squeezed out of warm Wine or Water, that he may have a clear View of the Bottom of the Wound. But whenever the Flux of Blood from the Wound is very violent, it must be instantly dressed up, and the cleaning of it in this Manner deferred, till it is in a quieter Disposition.

What internal Parts are wounded may be discovered,
1. By Anatomy.
2. By the Posture of the wounded Person.

XIII. In deep Wounds we are to examine, whether the fat and fleshy Parts are the sole Objects of the Wound, or whether some considerable Blood-vessels, or other internal Parts, are not Partakers of the Injury. We are assisted in this Examination by several Means. Our first Assistance we receive from the Knowledge of *Anatomy*, since by that Science we are taught the Situation of each particular Artery, Nerve, Tendon, Viscus, and Intestine. The *Posture of the wounded Person* at the Time he received the Injury is also to be diligently considered, whether he was standing upright, or lying down, and to which Side he inclined; by this Means we may with some Certainty judge what Parts were Sufferers by the Wound, and how far the Weapon penetrated. We are also to consider of the *Posture, Manner, and Force used by the wounding Person*; for the greater degree of Force there was in dealing the Blow, so much the larger and deeper will the Wound be. Nor should we neglect here to enquire after the *Shape of the Weapon* by which the Wound was inflicted, since by considering its Size, and observing the Quantity of Blood that adheres to it, we may in some Measure judge of the Depth of the Wound.

3. By the Posture and degree of Force used by the wounding Person.
4. By viewing the Weapon.

5. By the Disturbance given to Actions of particular Parts.

XIV. In a word, there is nothing will give you truer Light into the Nature and Consequence of a deep Wound, than a due Consideration of what natural Actions of the Body are impeded or disturbed thereby. For instance, in Wounds of the Breast, when the Patient draws his Breath with Shortness and Difficulty, and is at the same time attended with an Hæmoptysis and Hiccoughs, we may fairly conjecture that the *Lungs* or *Diaphragm* are wounded; though the Hiccoughs often arise too from Wounds in the Stomach, in the Bladder, and other internal Parts of the Body: So in Wounds of the Abdomen, when Chyle is voided,

voiced, it is a plain Indication that the *Stomach*, the *small Intestines*, or the *Lacteal Vessels* are wounded. When Excrements pass by the Wound, the *large Intestines* are wounded. In the same manner, an Effusion of Bile shews the *Liver* or *Gall-Bladder* to be divided. If Urine passes by the Wound, the *Bladder*, or *Ureters* are injured: but bloody Urine denotes a Blow on the *Kidnies*, or a Wound of the *Bladder*; but when the Discharges of Blood this Way are violent, it is a strong Indication that some of the larger Blood-vessels must be wounded. Vomiting of Blood, for the most part, declares the *Stomach* to be the injured Organ; violent Pains, attended with convulsive Twitches, shew that a Nerve is wounded, or that some foreign Substance is left in the Wound. Whenever the Senses are disordered after a Wound received upon the Head, a Concussion of the Brain is much to be feared.

XV. What we have laid down concerning the general Method of forming the *Diagnosis* on Wounds, will also serve us in forming their *Prognosis*, or Judgment of the Consequences that will attend them: For after a due Consideration of the Nature of a Wound, and the Symptoms attending it, it will be no very difficult matter, to determine whether it be attended with great danger or not, whether the Cure will be difficult or easy, whether it will be a perfect or imperfect Cure. We may remark in general, that slight Wounds admit of an easier Cure than deep ones: Young Patients, or those of a sound Constitution, are easier cured than the old or diseased, particularly than Hydropical, Consumptive, Scorbutical, or Pocky Persons. The cure is easier performed in a temperate Air, than in a cold or hot Climate. There are also greater hopes of Success where there are no violent Symptoms attending, as profuse Hæmorrhages, large Tumors, vehement Pains, Convulsions, Inflammation, Fever. But HIPPOCRATES has very rightly remarked ^a, “Where a large Wound is made, it is a very bad sign if no Tumor succeeds.” This CELSUS has explained in a much more elegant manner ^b: “It is of bad consequence for a Wound to be attended with a large Tumor, but it is of the last consequence if it is attended with no Degree at all of Tumor; the first is an Indication of great Inflammation, the last of Mortification.” Some Degree of Tumor therefore is best.

XVI. We come now to enquire what Wounds admit of Cure, and what are incurable or mortal. The Knowledge of this Point is no less useful and necessary to the Physician and Surgeon, than it is difficult to attain: And more especially as the Law inflicts a very heavy Punishment upon Murderers, it is of very great Consequence to be able to distinguish what Wounds are of themselves mortal, and what only become so by Accident or Neglect; that the Guilty may receive their just Sentence, and the Innocent be freed: On which Account the most eminent Physicians and Surgeons are often called in, and, with great Reason, by the Administrators of Justice, in all Cases of Difficulty or Uncertainty. In order to enable the Surgeon to answer Questions upon this Head with greater Readiness and Certainty, we shall be very particular in this Article. Therefore in this View we shall divide Wounds into three Sorts. Some Wounds, 1. Are absolutely of themselves mortal: others, 2. Are in their own Nature mortal, if not relieved by timely Assistance; others, lastly, 3. Become mortal by Accident or imprudent Treatment, though they were otherwise curable.

^a HIPPOCRATES, Aphorism, 66. Sect. V.

^b Book V. Chap. 29.

1. Mortal Wounds.
1. Where there is an Hæmorrhage not to be stopped by Art.

XVII. We properly style those *Wounds mortal, which are not to be remedied by all the Art and Industry of Man*. So those Wounds are justly deemed mortal that are attended with so violent an Hæmorrhage as to produce instant Death. In this Class are reckoned Wounds that penetrate the Cavities of the Heart, and all those Wounds of the *Viscera* where the larger Blood-vessels are opened. Such are large Wounds of the Lungs, Liver, Spleen, Kidnies, Stomach, Intestines, Mesentery, Pancreas, Uterus, Aorta; of the Iliac, Cœliac, Renal, Mesenteric, Carotid, and Crural Arteries, (especially if they are wounded near their Origin) of the Subclavian also or vertebral, of the Vena Cava, the Iliac Vein, internal Jugular, Vertebral, Renal, Mesenteric, of the Vena Porta, and of other large Veins that lie deep in the Body, because their Situation will not admit of proper Applications to restrain the Flux of Blood. I think therefore I may very justly reckon these amongst the Wounds that are absolutely incurable, since they are not remediable either by Astringents, Ligature, or Fire. We may refer also to the same Class the Wounds of the Brachial Artery, if near its Origin; for the large Effusion of Blood generally destroys the Patient before Assistance can be procured; more especially if the Artery and Vein are both wounded together.

2. Where the Communication is cut off between the Head and the Body.

XVIII. Those Wounds are no less mortal than the former, *which obstruct or entirely cut off the Passage of the Animal Spirits to the Heart*. Such are Wounds of the Cerebellum, Medulla Oblongata, and all violent Strokes of the Brain itself. There is Reason to apprehend very great Danger, when the small Veins or Arteries which are contained in the Cranium are injured; for the Blood flowing from them into the internal Sinuses of the Brain, either produces too great a Pressure upon those very tender Parts of the Brain, and so obstructs the Course of the Blood and Spirits; or being corrupted, putrefies the Brain, if it cannot be evacuated by the Assistance of the Trepan, which is the Case when this Accident happens at the lower Part of the Cranium, or in the Sinuses of the Brain. Nor is there less Danger, where *the Nerves which tend to the Heart, or the Cerebellum*, are wounded, or entirely divided; for after this, it is impossible for the Heart to continue its Motion.

3. Where the Power of Breathing is taken away.

XIX. To this Class also are to be referred *all Wounds that entirely deprive the Animal of the Faculty of Breathing*. Therefore there is great Danger where the *Aspera Arteria* is completely divided; for where it is only divided in part, it may be healed again by the Assistance of an expert Surgeon. I have many ^a Histories of Cures of this Kind, both by myself and others. To this Place also belong violent Shocks of the *Bronchia*, (as the *Par Vagum*, or *Intercostals*) *Mediastinum*, and Diaphragm, especially the tendinous Part of it.

4. Where the Course of the Chyle is interrupted.

XX. Those Wounds, also, *which interrupt the Course of the Chyle to the Heart*, are no less incurable than the former: Such are the Wounds of the Stomach, Intestines, Receptacle of the Chyle, Thoracic Duct, and larger Lacteals: to which we may add Wounds of the *Œsophagus*, if they are large; though Death is not so sudden an Attendant upon these Wounds, but for Want of Nourishment they are greatly weakened by Degrees, and die consumptive.

^a See BOHNVUS de *Vuln. renunc.* Pag. 21. though he reckons these among incurable Wounds.

XXI. In this Place we must by no Means omit to speak of *Wounds which are inflicted upon the interior membranous Parts that contain some secreted Fluid*, as on the Bladders, either for the Bile or Urine, the Ureters, Stomach, Intestines, Receptacle of Chyle, and Lacteal Vessels. The Fluids contained in these Parts, when once they are let loose into the Cavity of the Abdomen, cannot be properly discharged, and therefore easily corrode the internal Parts of the Body; and the Membranes that contained them are generally so fine, that they will not admit of Agglutination, especially since no Medicine from without can be applied: A few, indeed, have recovered after slight Wounds in these Parts, but since that Number is but few, and the Cure was accidental, and not performed by the Surgeon's Art, I think I am sufficiently justified in adding these to the Number of incurable Wounds.

5. Where the abdominal Fluids which are contained in Membranes are extravasated.

XXII. We have hitherto been treating of Wounds that were curable by no Art or Industry; we proceed now in order to describe those *which prove fatal, if neglected and left to Nature*. By these we mean those Wounds that produce instant Death, unless relieved by present Assistance, but are curable by a good Surgeon called in time; such are Wounds of the larger external Blood-vessels, which might be remedied by Ligature, by the Application of astringent Medicines, or of the actual Cautery. Of this kind are Wounds of the Brachial or Crural Artery, unless they are too near the Trunk of the Body. Wounds in the large Arteries of the Cubit or Tibia, of the Branches of the external carotid and temporal Artery, are of this kind; to these may be added Wounds of the Jugular, and other Veins situated upon the external Parts of the Body; but in these Cases we always suppose that Help is called for before there has been a vast Profusion of Blood.

II. Wounds proving mortal, if left to themselves.

XXIII. *Wounds are properly said to become mortal by Accident, where the Patient's Death is occasioned either by the ill Conduct of the Patient himself, or by the Ignorance or Neglect of his Surgeon, the Wound itself being deemed curable*. Under this Head are to be reckoned, 1. *Those Wounds which the Surgeon has neglected to cleanse sufficiently, though he had it in his Power to do it*; as when some foreign Body, which might easily have been extracted, is left in the Wound by the Carelessness of the Surgeon, and produces Inflammations, Hæmorrhages, Convulsions, and at last Death itself. So in Wounds of the Thorax and Abdomen, if the Surgeon does not use his utmost Diligence to evacuate the grumous Blood, it will corrupt there, and by drawing the neighbouring Parts into consent, will expose the Patient to instant Death^a. Therefore great Care must be taken that

III. What Wounds become mortal by Accident.

^a There are some Cases where the Surgeon finds all his Attempts to evacuate the Blood fruitless, and there he is in no wise to be blamed, but the Wound is to be looked upon as mortal. Take the following Case by way of Example: In the Year 1725, a Man received a Wound by a Sword: the Sword entered about half an Inch below the right Pap, between the fifth and sixth Ribs, and passed downwards through the Diaphragm into the Cavity of the Abdomen. Now although a considerable Quantity of Blood was discharged by the Wound for the three first Days, yet it was impossible that the Blood which was extravasated in the Cavity of the Abdomen, should be discharged by the Wound at the Breast, the Patient therefore died on the eighth Day. His Body being opened, we found a large Quantity of grumous Blood under the Liver, which adhered so strictly to its concave Part, that we found it difficult to separate them with our Fingers. Upon clearing away the Blood, we perceived a Wound through the Body of the Liver, about half an Inch wide, and a Wound answering to that in the muscular Part of the Diaphragm. There were two or three Ounces of Blood found in the lower Part of the Abdomen, but none in the Cavity of the Thorax. From

the Lips of the Wound do not close, till the Blood which is collected in the Cavity of the Body be all evacuated, if possible, which you will easily perceive by the difficulty of Breathing, and other bad Symptoms being removed ^b. But if any of the larger internal Vessels are wounded, then all Attempts to discharge the Blood are vain; for the violence of the Hæmorrhage takes off the Patient.

2. *Wounds also are reckoned mortal by Accident, which are treated or searched in too rough a manner by the Surgeon;* for if you handle Wounds roughly, that are full of nervous Parts or large Blood-vessels, there is great Danger of bringing on Hæmorrhages, Convulsion, Inflammation, Gangrene, and Death itself. The Case is also the same,

3. *In external Wounds which are slight of themselves, but the Patient is lost by the Violence of the Inflammation, which is brought on, and increased by the Surgeon's injudicious Treatment.* Or,

4. *When any one is taken off by the Violence of the Hæmorrhage from a Wound of the Hand or Foot;* for in this Case a Surgeon might easily have stopped the Blood by the Application of proper Remedies, or by the actual Caustery, or Ligature. Or,

5. *Where the Patient is guilty of any Intemperance in eating or drinking, of excess of any Passion, of exposing himself to the cold Air, or of using any violent Exercise.* For by this means Wounds, more especially those of the Head, by being liable to fresh Hæmorrhages, and other dangerous Accidents, frequently become mortal, notwithstanding the Surgeon uses his utmost Care and Skill. Under this Head also are to be reckoned,

6. *Those Wounds of the Head where the Patient is lost by the vast Quantity of Blood which is extravasated in the Cavity of the Cranium, and confined there;* but where he might have been relieved if the Trepan had been used in time; for though Wounds of this kind generally prove incurable, yet as there is a Possibility of saving a Person in these Circumstances by the use of the Trepan, this may properly be reckoned amongst the doubtful Cases, and not deemed absolutely mortal. Lastly,

7. *A bad Habit of Body frequently prevents the Cure of Wounds, which would admit of an easy Cure in an healthy Subject.* So you frequently see the slightest Puncture in the Hand or Foot of an Hydropical, Consumptive, or Scorbutil Person, shall produce a Gangrene, and prove mortal, though the Surgeon neglects no proper Application to prevent it. I know very well that some Physicians reckon all Wounds of this kind as absolutely mortal; but I think they are much better justified who pronounce a milder Sentence, and deem them of the doubtful Kind.

the Impossibility that appeared of discharging the extravasated Blood, and the Largeness of the Wounds of the Vessels, I pronounced this Wound mortal: but, to my great Surprise, some Physicians declared it so only *per accidens*, for which reason the Murderer was acquitted. Whose Opinion was most justifiable, I leave to others to determine. See *Fr. Hoffman. Consult. Tom. I. p. 376. & seq.*

^b The Surgeon is not to be blamed if he is sometimes deceived in this Point; of which I will here give you a notable Instance. In the Year 1726, a Man at *Helmstadt* was wounded in such a Manner under the right Pap, that the Blood did not only flow in great Quantities from the Wound, but discharged itself also by the Mouth: but in two Days time the discharge of Blood, both at the Wound and by the Mouth, through the Application of proper Medicines, entirely ceased, and the Patient found himself in so good Order, that he expected in a very short time to get abroad: He breathed so freely, that he easily prevailed upon me to remove the Tent that I had put in to keep the Wound open. But behold the Consequence! after remaining in this Manner entirely easy for two Days; on the third he died suddenly. Upon opening the Thorax, we found at least a Pound of concremented Blood, which could by no Means have been discharged, since there

XXIV. We have laid down these Principles to guide Physicians in giving their Opinions in Courts of Justice, concerning the necessary Consequences and Fate of Wounds. Although all Wounds should be examined upon these Occasions with great Circumspection, yet none require more careful looking into than Wounds of that Class which are described under N. XXII, because there are great Dissensions amongst the Learned upon this Head. Some are of Opinion, that the Wounds mentioned at N. XXII, are to be referred to the third Class, and so are to be reckoned mortal only by Accident, and by this Means they frequently acquit a Murderer. How they support this Opinion I cannot tell. For my own Part, whenever I have found a Man lose his Life by receiving a Wound in an Artery, at a Time of Night when a Surgeon could not be called, I have always determined that Wound to be mortal, and that the offending Party was guilty of the Murder. On the other hand, where a Wound of the same kind has been received in the Day-time, and the Patient has lost his Life by the neglect of the By-standers, in refusing to call proper Assistance, or by the Ignorance of the Surgeon; in these Circumstances I have always declared the Wound to have been mortal only *per accidens*, and have given my Opinion, that the accused Person ought to be acquitted, and the Surgeon indicted. But in order to form a proper Judgment in these Cases, it is necessary that we should be well informed of all the Circumstances.

It is difficult to form a Judgment concerning the Fate of Wounds.

XXV. In very doubtful Cases, to be sure the mildest Sentence ought to take Place, according to the old saying, *It is better to let ten guilty Persons escape, than to punish one innocent Man*: For to be too rigid in these Cases, will not only burden the Conscience of the Judge, but be also injurious to the Public.

What is to be done in doubtful Cases.

XXVI. For the use of the younger Surgeons, I shall here subjoin the Form which I always use in giving my Opinion into Court, concerning the Nature of a Wound.

The Form of delivering in a Surgeon's Opinion.

appeared no Symptoms which could give room to suspect that there remained any extravasated Blood concealed. Besides, BELLOST, DE LA MOTTE, and several other celebrated Surgeons amongst the Moderns, absolutely forbid keeping Wounds of the Breast open by the use of Tents, though I doubt much whether this Advice is always to be followed. But I leave this to the Determination of others.

As an Example of this, take the following Relation. In the Year 1733, a Woman living in the Suburbs near *Brunswic*, walking out in the Evening just before the Gates of the City were shut, received a Blow on the Head from a Man with a large Club, which laid her flat upon the Ground, and left her quite senseless; when the Fellow saw this, he took to his Heels, and nobody was left near her, but her Husband and three small Children; the Man, frightened out of his Wits, ran about to see if he could get People to assist him to carry his Wife home (for she was a very large Woman) but the Night coming on he could prevail with no one, and the City Gates being shut, it was impossible to bring a Surgeon to her: the Woman therefore was left upon the Ground all Night, without any Assistance, and died the next Morning. When the Physicians and Surgeons came to examine her, they found a Fissure in the Cranium, and, upon raising the Scalp, they found a large Quantity of extravasated Blood under the *Dura Mater*, lying upon the right Lobe of the Brain, and therefore very judiciously determined it to be a mortal Wound. The Advocate for the Criminal opposed this Verdict, because there was no Surgeon called to treat her in a proper Manner, by which she might possibly have been saved; upon this Difference of Opinions I was called upon to determine this Matter. I declared as my Opinion, that if the Woman had been within the City, where she might have had the Assistance of Physicians and Surgeons, and had lost her Life through their Neglect or Ignorance, then the Wound ought to have been deemed mortal *per accidens*; but in the present Case, it was impossible she should have had any such Assistance, therefore her Death was occasioned by the Blow she received, and the Wound ought to be judged mortal *per se*.

“ I the underwritten, having this Day diligently examined the dead Body of
 “ A. B. in the Prefence of C. D. E. &c. found it to have received the follow-
 “ ing Wounds: that is to say, in the back Part of the Body, under the right
 “ Shoulder, I discovered a Wound of the width of one Inch, through which I
 “ could pass my Finger with great ease, between the Ribs, into the Cavity of
 “ the Body. Upon opening the Breast, almost the whole right Side was found
 “ full of coagulated Blood, upon removing which, I found a Wound also pene-
 “ trating into the right Lobe of the Lungs, which not only pierced through
 “ this Lobe, but also divided some of the larger Branches of the pulmonary
 “ Vessels, with the *Bronchie* themselves. The Heart and all its Vessel were
 “ entirely empty: no Mischiefe appeared either in the Head or Abdomen. The
 “ Effusion of Blood, which was occasioned by dividing the Vessels in the Lungs,
 “ could not but bring on instant Death: Therefore I hereby declare this Wound
 “ to have been the Occasion of his Death. In testimony of the Truth whereof
 “ I have hereto set my Hand.”

Done at the Day of N. N.
 in the Year of our Lord

Some gene-
 ral things
 with Respect
 to these
 Forms.

XXVII. Forms without Number may be made from this, by varying the
 Circumstances. But above all I would advise the young Surgeon to be very
 careful in examining the State not only of the wounded Parts, but also of the
 Contents of the Cranium, Thorax, and Abdomen, that he may observe whether
 any thing preternatural has happened in either of those Cavities. If any one is
 desirous of being more thoroughly instructed in the Method of examining the
 Bodies of murdered Persons, and in the proper Forms of making a Report, let
 him consult a *French* Treatise upon this Subject, entituled, *L'Art de faire Rap-
 port en Chirurgie*.

The CURE of WOUNDS.

Cure of
 Wounds.

XXVIII. Since a Wound is a Solution of the Continuity of the Parts of the
 Body, the Reunion of those Parts seems to be the principal Intention. But since
 Wounds are of very different Kinds, some slight, and others of great Con-
 sequence, in Proportion to this Difference so will the Manner of prosecuting this
 Intention differ.

Cure of slight
 Wounds.

XXIX. The Cure of slight Wounds is generally performed with great Ease,
 by applying a small Portion of Lint to the Part, well saturated *cum Spiritu
 Vini, Oleo Ovorum, Terebinthinæ, Hyperici, Linimento Arcæi, Balsamo Copaibæ,
 de Mechâ, Peruviano, &c.* securing the Dressings with a ^a Plaster to keep the
 Wound clean. The Dressings should be renewed once in a Day or two, and
 the Lips of the Wound will presently agglutinate: Therefore, in Cases of this
 Kind, a Surgeon is very rarely applied to.

Dangerous
 Wounds
 how to be
 treated.

XXX. Wounds which are attended with some Danger, where the Substance
 of the Part wounded is not impaired, are to be treated as follows. If there
 be too copious a Discharge of Blood, the Hæmorrhage must be stopped at
 the first Dressing: If not, the Wound in the first Place is to be cleansed
 from all extravasated Blood, Sordes, &c. In the next Place, if a Bullet,

^a The Plasters I chiefly use are *Empl. Diachyl. S. Diapalm. or Stypticum Crollii*.

the Point of a Sword, any Part of the Clothing, a Piece of Glass, Splinter, or any other foreign Body, shall remain in the Wound, it is to be removed with the Fingers, or with proper Instruments, as shall be explained more fully below. Then the divided Parts are to be brought as near each other as possible, and their Situation is to be so maintained, by proper Bandages, that the Cicatrix which is left may appear even.

XXXI. Foreign Bodies are removed from Wounds either by the Surgeon's I. Method Fingers, or by such Instruments as we have described at *Plate III, Fig. 3, 4, 5,* used in cleansing Wounds. 6, 7, 8, having first enlarged the Orifice of the Wound, if there be Occasion. But where there are no extraneous Bodies to be removed, and the Hæmorrhage is not large, the grumous Blood is to be wiped away with a soft Sponge, or some fine Lint, wrung out of hot Wine or Brandy: having done this, you must proceed to dress, and lastly to agglutinate the Lips of the Wound.

XXXII. Before a Surgeon attempts the removal of extraneous Bodies from a Wound, it behoves him well to examine whether this is to be done instantly, Method of extracting foreign Bodies. or whether it is not best to wait for a more convenient Time. For if the Patient is become extremely faint, from the Loss of Blood which he has already sustained, it will be necessary here to stop the Hæmorrhage, and to endeavour in some Measure to revive him with moderate Draughts of warm Broths, White Wine Whey, or of some cordial Medicine: For if some such Precautions are not taken, the Patient may not unlikely die in the Operation. So, where you have Reason to apprehend, that, in extracting the broken Point of a Sword or Spear, you are in Danger of wounding a large Blood-vessel or Nerve, it is better to wait a little till the Patient comes to himself, or till the Wound is somewhat enlarged by the Suppuration of the Parts. All these Circumstances will be well weighed by the prudent Surgeon.

XXXIII. Foreign Bodies, as the Points of Swords, Spears, &c. should always be extracted from Wounds by the Hand if possible; and this should be done with all the Expedition, Tenderneſs, and Care that may be, taking great What Instruments are used in extracting Bodies from Wounds. care not to wound the neighbouring Parts; but if there are any Bodies that cannot be removed by the Hands, then you must have Recourse to such *Forceps* as we have described in *Plate III, Fig. 3, 4, and 5.* The same Assiſtances also we make use of in extracting Bullets, broken Pieces of Steel, Glass, &c. We shall speak more clearly of the Method of extracting Bullets, when we come to treat of Gun-shot Wounds. Where the Wound is too narrow to admit of the Extraction of a foreign Body without lacerating the Parts, it must be dilated with the Knife, according to the Direction of the muscular Fibres. The Extraction will admit of no Delay, but for Reasons of great Moment, (*N. XXXII.*) besides, whilst the Wound is recent, and the Lips of it not swelled, it will suffer less Pain in handling; and the Patient, from a strong Desire of living, will at this Time endure more than afterwards, when he comes to reflect.

XXXIV. The Wound being cleansed from Blood, and all extraneous Bodies, II of uniting dangerous Wounds. and the Hæmorrhage stopped, it now becomes the Business of the Surgeon to close the Lips of the Wound, and to consider what is proper to be done to keep them in that Situation, that the Parts may speedily unite. Different Methods are used in prosecuting this Intention, according as Wounds differ in their Consequences, and in the Number and Degree of Symptoms attending them. For simple and slight Wounds require not the same Treatment as those which are

are attended with dangerous Symptoms, or where the wounded Parts are torn and mangled. Again, Wounds, which penetrate into the Cavities of the Body, especially if any of the Viscera are injured, demand a different Method of Cure from those which are inflicted on the external Parts. And, lastly, another Distinction must be considered, whether the Wound was made by a Stab, or a Puncture.

Method of
treating a
Puncture.

XXXV. Amongst the Number of the most simple Wounds, we reckon those which are made by Puncture, or stabbing, upon the external Parts, and not penetrating deep. In these Wounds, after the Blood has been stopped at the first Dressing, by the Application of dry Lint, the common Digestive, or *Balsamum Arcaei*, or any of the vulnerary Medicines recommended in the Introduction, N^o. XXXVII. is to be spread upon a Pledget, and applied once every Day; or if the Discharge is but small, every other Day, covering the Dressings with a Plaster and Compress, and securing the whole with a proper Bandage. At every Dressing you should be careful to remove every thing that will give way readily; the Pus, or Sanies is to be gently wiped off with fine Rags. It may be remarked in general, that too frequent Dressings do more Harm than Good, unless a more than ordinary Discharge of Matter, particularly in the Summer Time, or any other bad Symptom, require it: The Truth of this is attested by CÆSAR MAGATUS, in his Book, *De rarâ Vulnerum Deligatione*; by BELLOSTE, in his *Hospital Surgeon*, and others amongst the Moderns; not to mention my own Experience upon this Head. The first Dressings that are applied, especially where there has been a Flux of Blood, should by no means be removed forcibly, but be left till they fall off of themselves, which they will do when the Suppuration is formed: By this Means much Pain, and perhaps a fresh Hæmorrhage, may be avoided. But when a punctured or stabbed Wound penetrates very deep, the Cure is attended with many Difficulties, especially if a Nerve or Aponeurosis is lacerated, if the Wound is made perpendicularly down, and has no depending Orifice; for in this Case the Blood and Matter are easily collected at the Bottom, protract the Cure, and frequently form Fistulæ. To prevent these Consequences, it will be proper to press the Wound from the Bottom upwards; to apply a Compress towards the Fundus of the Wound externally, and to apply what is called the *expelling Bandage* over all, which presses much tighter upon the lower than the upper Parts.

A new
Opening is
frequently
required.

XXXVI. But if all this Precaution should prove of no Effect, which is frequently the Case, it will be best to make a large Opening at the Bottom of the Wound before any Fistulæ are formed. In order to make this Opening to the greater Advantage, it will be proper to get a particular Sort of Probe or Needle, very blunt at Top, as at the Letter A; but at the other End provided with a large Eye or Hole through which a Linen Rag may be passed, (*See Plate V, Fig. 1.*) This Probe is to be passed to the Bottom of the Wound, and the blunt Part of it pressed outwards towards the Skin, till you can feel it with your Finger. When you have felt it, cut down upon it, if you can safely, and make a large Opening, spread the Rag that you have run through the Eye of this Probe with some vulnerary Balsam, and draw it through the Wound after the Manner of a Seton, especially in Gun-shot Wounds, and leave it there, dressing up both the Orifices with the same Balsam, covering the Dressings with Plasters and proper Bandages. In every succeeding Dressing, the Part of the
Rag

Rag that is left out of the Wound is to be spread with fresh Ointment, and the lower Part drawn down till this takes Place; and this Method is to be continued till the Wound is well cleansed, the Discharge greatly diminished, and all in a Readiness to heal: The Seton is then to be removed, and the Wounds healed as usual.

XXXVII. GARENGEOT describes a triangular Instrument, invented by PETIT, for this Purpose, which the *French* call ^a *Trois quarts*: With this he makes an Opening at the Bottom of the Wound or Fistula, and introduces a Rag, which is passed through the Eye of this Instrument, and then through the Wound or Fistula, (See Plate IV, Fig. 1.) But as this Instrument is strait, and I have frequently met with Cases where that Form would not answer the Purpose, therefore I invented another, long before GARENGEOT's Book came out, for the Use of a Nobleman, who had a large Abscess in the fore Part of the *Abdomen*, which opened near the Navel on the right Side, but penetrated as far as the Groin on the same Side. The Situation of the crural Vessels, in this Case, would by no Means admit of a new Opening, being made by a strait Instrument. I invented therefore a crooked one, somewhat like the Instrument that is used to draw Water off in hydropical Cases, but longer, because the Fistula was of a great Length; (See Table IV, Fig. 2.) by the Assistance of which, whilst I directed the Apex towards the Skin, I easily made a new Aperture, without endangering the crural Vessels: And that I might at the same Time introduce the Seton, I contrived a Sulcus near the End, to which I fastened a strong Thread, and by drawing back the Instrument, I easily introduced the Seton through the Fistula. When the Seton was near all used, I sewed new Cloth to the old, and so introduced it through the Wound, cutting off the foul Part, going on in this Manner till the Wound was sufficiently cleansed, and so preventing the Necessity of frequently introducing the Instrument.

XXXVIII. It is to be remarked here, that although, in some Wounds, it is no Matter how soon you suffer the Opening to heal; in this case, on the other Hand, you must take great Care that the Orifices are not healed before the Bottom of the Wound. This may be done by the Assistance of a Cloth somewhat twisted, by the *French* called *Bourdonet*, or a short soft Tent. But when it is healed from the Bottom, you may remove the Tent, and heal the Orifices. How Wounds of this kind, which penetrate into the Cavity of the Thorax or Abdomen, are to be treated, will be taught below in the Vth and Xth Chapters.

XXXIX. Wounds which are made by a cutting Instrument, where no Part of the Flesh is taken off, and the Accident happens to the external Parts of the Body, and does not penetrate deep, after they are cleansed should be dressed with some ^b vulnerary Balsam, and the Lips of the Wound should be closed and kept in that Situation: This is done after different Methods, according to the difference of the Wound. 1. This is to be obtained by placing the wounded Part

^a *Traité des Instrumens*, Tom. I. pag. 391.

^b Besides the Medicines, which we have recommended above, at N^o. XXIX, we may add here *Essentia Succini Terrebinthina*, *Mastichis*, *Myrrha* & *Aloes*, *Gemmarum Populi*, &c. We must observe, too, that where a Contusion is added to the Wound, which is the Case in Wounds made by Glasse, Saws, &c. the mildest vulnerary Oils and Balsams are to be applied, as *Ung. Digestivum*, or *Balsam. Arcei*; but in those made by Knives, Swords, &c. the Essences and Balsams which we have just described are to be preferred, as being more astringent and drying.

in a proper Posture; as soon as the Wound is dressed, the Part should be placed in such a Situation, that the divided Parts may be most likely to be in constant Contact, repeating the Dressings once a Day, as we observed before, N^o. XXXV, or at least every other Day. 2. By *proper Bandage*; tying up the Parts so that the Lips may meet, and so easily unite. This is attended with the greatest Success in Wounds that are made lengthways, as in the Fore-head, Abdomen, Arms or Legs; for in this Case the *uniting Bandage at Plate II, Lett. F.* answers the End completely. 3. By a *proper Suture*, which differs according to the Difference of the Wound, but may be generally divided into the dry and bloody Suture. The *dry*, or, as some call it, the *bastard Suture*, is the Application of sticking Plasters to keep the Lips of the Wound united: The *bloody*, or *true Suture*, is performing the same thing with a Needle and Thread.

What
Wounds re-
quire a Su-
ture.

XL. All Wounds are not to be united by the Needle; but those only that are oblique, transverse, or angular, and at the same Time very large and deep; or in Cases where a Part is near cut off, as in the Nose, Ear, Chin, Cheeks, &c. if a Wound is so circumstanced, that it cannot be kept in a proper Situation by Plasters and Bandages. 1. Wounds that are to be stitched should be in their recent State, and properly cleansed from extravasated Blood, and all extraneous Bodies. 2. There should be no Loss of Substance, except in those fleshy Parts that are easily elongated, as the Lips. 3. There should be no Inflammation or Contusion. In these Cases the Lips of the Wound are closed more elegantly and more successfully by Suture. On the contrary, Wounds of long standing, rancid or foul, attended with Venom, or that have their Seat in the Breast; or, lastly, where the larger Arteries, Veins, or Nerves are injured, cannot be sewed up without imminent Danger.

When, and
in what
Manner, the
dry Suture
is to be per-
formed.

XLI. The dry Suture is to be used in slight Wounds, and especially when they happen in the Face, and indeed wherever you think it is of Force enough^a to keep the Lips together: As it gives no fresh Pain, and occasions no Scar; it is much fitter for Wounds of the Face than the Needle, especially as the Needle, beside the Pain and Scars it occasions, often produces no small Inflammation. The Plasters which are to form the dry Suture should be of a sufficient Length, and shaped like the Part to which they are to be applied, so as to surround the greatest Part of it; but not the whole, lest they should retard the Circulation of the Blood, and bring on Tumors and Mischiefs of that kind. They must also stick very fast: which Purpose is excellently well answered by the *Emplastrum ANDREÆ A CRUCE, vel Stypticum CROLLII, vel Diachylum, vel Diapalmæ, Terebinthinâ probe subactum*. The Hæmorrhage being stopped, and the Wound well cleansed, some tenacious vulnerary Balsam, such as *Essentia Mastichis, Succini, Balsami Peruviani*; or the *Balsamum Præfecti Equitum Meliten-sium*, which you will find described in *LEMERII Pharmacopœia Universalis*, under the Title of *Balsamum Equitis Sancti Viëtoris*. These, and indeed all Balsams of the gummy Kind, best answer the Intention in this Place, for they presently form a sticky balsamic Crust, which denies all Entrance to the Air, and presently brings on the desired Union; but over this a sticking Plaster is to be laid, adapted to the Size of the Part; you may apply two or more, according as

^a Where the Finger has been cut almost off, so as to hang by a Piece of Skin, and the Surgeons have advised it to be taken off, I have cured it by this Suture frequently, and the Bones have united.
you

you see Occasion, leaving a Space between. The manner of applying them you will see at *Plate IV, Fig. 3, 4, 5.* they are to be secured in their Situation by the Application of proper Boulsters and Bandages.

XLII. According to PETIT's Method, the sticking Plasters should have one, two, or more Openings in the Middle, *See Plate II, Fig. 11.* or in the Manner of those at *Plate IV, Fig. 7.* that you may discover through these, as by the Spaces left between, in the former Method, whether the Lips of the Wound were properly united or not: And that you may also be able to apply proper Remedies to the Part, without removing the Plasters. These Plasters are applied in the same Manner as the former, and left on till the Work is completed. But the dry Suture may be formed also after another Manner; to wit, make two Plasters after the Prescription of ANDREAS A CRUCE, spread upon strong Cloth, answering in Size to the Wound; to the Sides or Margin of these fasten three or four Tape-strings, according to the Length of the Wound: And then, after warming the Plasters, apply them on each Side of the Wound, about the Distance of a Finger's Breadth from it, after the Manner described at *Plate IV, Fig. 8.* After this bring the Lips of the Wound together, dress it up in the Manner we have described above, and whilst an Assistant keeps the Lips of the Wound in their proper Situation, let the Surgeon tie the Ends of the Tapes, first in a single Knot, and then in a slip Knot, to keep the Parts in Contact. Over each should be laid an oblong Compress, and over all of them a large square one, the whole to be bound up with a proper Bandage. On the next Day the Wound is to be examined, and if the Tapes are loosened they must be drawn tighter again; but if they are not loosened, let them remain untouched, only moisten the Parts with a few drops of Balsam, covering them up again with the Compresses and Bandage as before. If they are too tight, and a violent Inflammation succeeds, they may be relaxed at Pleasure; but on the Decrease of the Inflammation they must be tightened again. Some, in the Room of Tape, use Clasps, made of Steel or Brals, as we have described them at *Plate IV, Fig. 9 and 10.* But this Method is less convenient than the former, and therefore in very little Use.

Other Methods of making the dry Suture.

XLIII. In large Wounds, especially transverse ones, as their Lips cannot be maintained in their Situation by the dry Suture, which is frequently the Case in Wounds of the Thigh, as you may see at *Plate III, Fig. 1, Letter H*; or in the Abdomen, Nates, or Arms; or where Pieces hang from the wounded Part, as in the Forehead, Checks, Nose, or Ears; or when large Wounds are made in an angular or cruciform Manner, as at *Plate IV, Fig. 12, 13, 17.* here you must use the Needle, which Operation is called the *bloody*, or *true Suture*. The true Suture is distinguished again into the *simple* and *compound*. The *simple Suture* is that which is performed only by the Assistance of the Needle and Thread; to this Class belong the *interrupted Suture*, the *Glover's Suture*, and the *twisted Suture*. The last is seldom used but in the Hare Lip; the second only in Wounds of the Intestines, under which Head we shall treat of it more largely; but the first is in common Use for all Wounds that require the true Suture, therefore we shall begin with the Description of that before the rest. The *compound Suture* is that which requires other Assistances besides the Needle and Thread. Of that below.

The bloody Suture where.

XLIV. The best Method of making the *interrupted* or *knotted Suture*, I take to be the following one: Take a double Thread well waxed, pass it through a

How to perform the interrupted Suture.

strong crooked Needle, as you may see *Plate I, Lett. S, T, V, or Plate VI, Fig. 5 or 6.* When the Lips of the Wound are brought together, and held firm in that Situation by an Assistant, with one Stroke pierce through them both, passing your Needle through the lower Lip from without inwards almost to the Bottom, and so on from within outwards, observing to make the Punctures at a Finger's Breadth from the Wound, (which in this Case we will suppose to be in Length two Fingers) varying this according to the Size of the Wound. After taking off the Needle, tie the Ends of the Thread, first in a single Knot, and then in a slip Knot, covering all with the Dressings which we prescribed in the dry Suture. But if the Wound is of such a Length, that one Stich will not be sufficient, then you may make two, three, or more after the same Manner that we have now described, always observing a Finger's Breadth Distance between each Stich. See *Plate IV, Fig. 11 and 16.* But to prevent the Knots from bringing on any Mischief, lay a small Linen Compress (*See Plate II, Fig. 22.*) over the single Knot, and make the slip Knot over that; which, if any Pain or Inflammation should succeed, may be easily loosened.

Some Cautions.

XLV. We proceed in this Manner in oblique or tranverse Wounds. But where there are Angles, as in a triangular Wound, *Plate IV, Fig. 13.* you are to proceed in the same Manner as before; only the Suture must begin at the Angle A; then the Sides of the Wound must be stiched about the Middle at B and C. If the Wound is quadrangular, or has two Angles like the Greek Letter Π , which sometimes happens in the Face, *See Plate IV, Fig. 14.* then the Sutures must be made in both the Angles A A. But when the Wound is so large, that these are not sufficient, then as many more as are necessary must be made in the middle Way between the Angles B B. When you meet with a cruciform Wound, as at *Fig. 6 and 12.* and the Lips of it cannot be kept in Contact by the Use of Plasters, the Needle, as at *Fig. 12.* must be passed in at A, and come out again at B; it must enter again at C, and come out again at D; the Extremities of the Threads must then be tied in the Manner we have before directed, between A and D. How the Wounds are to be treated afterwards we shall explain below.

The compound Suture.

LXVI. Some of the Surgeons amongst the Ancients used a *compound* Suture for large Wounds, in the Room of the interrupted Suture, which was made of two Pieces of Wood, by the *French* called *Chevelle*; and from thence the Suture was styled *Enchevillée*. And they preferred this, because it prevented the Lips of the Wound from being lacerated, which sometimes happened when the other Method was used, which not only prevented the Wound from uniting, but frequently brought on other grievous Disorders. And though this Method has of late Years been rejected as inconvenient, and particularly by *DIONIS* in his Surgery; yet it is not at this Day without its ^a Advocates, who highly commend it, and prefer it to the interrupted Suture in many Cases: But they use it with this Difference, that instead of two Pieces of Wood, they use Pieces of Plaster rolled up in a cylindrical Form, of the Length of the Wound, and about the Size of a Goose Quill, from whence it is by some called the quilled Suture. See *Plate IV, Fig. 17 and 18.* This Method prevents Tumors, Pain, and Inflammations, that might be brought on by the Hardness and Pressure of the

^a As *PALFYNUS*, in *Chirurgiâ*, Cap. VI. de *Suturis*; and since, *GARENGEOT* in *Chirurg. Cap. de Suturis*.

Wood. PALFYNNUS performs this Operation, in deep Wounds of the muscular Parts, (as the Thighs, Buttocks, Legs, Arms, &c.) with a large, strong, crooked Needle, furnished with a strong double Thread well waxed, (*See Plate IV, Fig. 15.*) which makes a Bow at one End. The Needle being passed through both Lips of the Wound, in the Manner we have before described, and a second and third passed in the same Manner, as is shewn at *Fig. 17.* a Roll of Plaster is to be introduced into the bow Ends of the Thread, which are left hanging out at BB. Then when the Needle is taken off at the other Side, another Roll is to be placed between the Ends of the Thread; and the Lips of the Wound being brought together, these Ends are to be gently tied over the Roll, first in a single, and then in a slip Knot, as at CCC. If there are three Threads, you are to tie the Middle first, and then the rest, treating the Wound afterwards, as we shall shew below.

XLVII. GARENGEOT performed this Operation much after the same Method we have just described, (*See his Book of Operations in Surgery, Chap. iii. on Sutures*) but with this Difference, instead of a double Thread, he made small Ligatures of six or eight Threads (according to the Size of the Wound) joined together and waxed, always observing not to make it so big, that when it should be doubled it should exceed the Size of the Needle, lest it should create Pain, by not passing readily after the Needle. When a sufficient Number of these Ligatures are passed through the Lips of the Wound, he makes a Knot upon each of the Ends that hang out of the upper Lip; *See Plate IV, Fig. 18. DDD,* and then unravels the Threads that compose the Ligature, between the Knot and the Lip of the Wound; and by this Means forms a Passage through which he can introduce the cylindrical Roll of Plaster. After this he claps two Fingers upon the lower Lip of the Wound, near the Punctures which were made by the Needle, and with the other Hand draws back the Ligature gently, beginning in the Middle, if there are more than two, till the Wound is exactly closed: Then he divides the Threads of each Ligature into ^a two Parts, with which he ties the other Roll as before, nicely joining again the Lips of the Wound. In tying these Ends, great Care should be taken not to make the Knots too tight at first, lest they should bring on Pain and Inflammation. The Wound is now to be covered with vulnerary Balsams spread on Lint, but especially with the *Balsamum Præfecti Equitum Melitensium*, which I have commended before, as it soon forms a healing agglutinating Crust, denies all Access to the external Air, and brings on the desired Union, to which you must add a Compress, a proper Bandage, and a convenient Posture of the Part affected.

XLVIII. On the first Days, after whatever Method the Suture is performed, the Bandage and Compress are to be gently removed, and the state of the Wound examined. If every thing looks well, and there is little or no Pain or Inflammation, the Sutures are to be let alone for six or seven Days, or longer, and the Wound be dressed up again as before, till it appears that there is a strict Union procured. But if the Stiches should appear to be too loose, the Knots should be tightened; if they are too tight they must be loosened a little. When the Lips of the Wound appear to be enlarged or bruised, they should be dressed with a digestive Ointment, or with the *Balsamum Arcæi*, the con-

^a GARENGEOT here orders them to be separated into three Parts, but what Use he puts the third Part to I can't comprehend; I am apt therefore to imagine, that there is some Omission in this Place.

tinuance of which will presently remove all these Symptoms. But when the Wound is attended with great Inflammation and Fever, the Stiches should be somewhat loosened, the Patient should be let Blood, and live upon a thin Diet, and the Body should be kept open. These Symptoms being removed, the Stiches should be again tightened by degrees and the Wound dressed as above. But if these Applications should prove fruitless, and the Complaints should increase, so as to threaten Danger, the Stiches must be cut, and the Wound treated as if there was a loss of Substance, which Method we shall explain below.

What is to
be done after
the Wound
is healed.

XLIX. On the other hand, if the Wound heals by the Assistance of the Suture, which you will be sure of, not only from observing the Lips of the Wound to lie close together and unite, but by the Relaxation of the Threads or Ligature upon the disordered Part; the Threads or Ligatures are to be cut near the Knots with Scissors, the lower Lip of the Wound is to be suspended with one hand, whilst the Threads are gently drawn out with the other. The Punctures that are left will easily heal by the Application of a vulnerary Water, called by the French *l'Eau d'Arquebusade*, or by injecting *Aqua Calcis*, or *Spiritus Vini*, and laying on Compresses dipped in the same Liquors. But larger Wounds are to be dressed with one of the beforementioned Balsams, and the Lips kept firm together with some sticking Plaster, till a firm Cicatrix is formed.

Of healing
Wounds
where there
is loss of
Substance.

L. Where there is loss of Substance, the Wound will not unite either by the help of Plasters or Suture, till it is filled up with new Flesh. For this Purpose you will find Lint dipt in Oil, or spread with some vulnerary Ointment or Balsam, and applied to the bottom of the Wound, very serviceable, covering it with a Plaster, Compress, and proper Bandages. This Dressing is to be repeated daily: though it is a very vulgar Error, to suppose that these Applications generate Flesh, which is produced by the circulating Fluids, that in a wonderful Manner are continually bringing something new to the wounded Parts. Yet it must be owned that Medicines of this sort conduce very much to the Generation of the Flesh, and to remove every thing that might hinder that End; therefore it is no wonder they are called *sarcotic Medicines*. There ought to be a balsamic and emollient Quality in these Medicines, that they may not only resist Putrefaction, but may also soften the young Flesh, so that it may easily receive Additions from the Blood, and suffer itself to be elongated. Of this kind are the Oils, Balsams, and Ointments, which we took Notice of at N. XXXV, and XXIX.

How the Air
is to be
kept from
Wounds.

LI. As hot or cold Air is very hurtful to Wounds, so it must by all Means be kept from them, for nothing will sooner corrupt the Juices, or shorten and dry up the vessels, and hinder the growth of new Flesh, than the Air. In order to prevent Inconveniencies from this Cause, the Surgeon should be careful not to remove the old Dressings till the fresh ones are got ready, and to be as expeditious as possible in applying them. Then the Wound must be filled up with Lint, dipped in Oil, or some emollient Balsam; to this must succeed some vulnerary Plaster, a Compress upon the Plaster, and last of all a Bandage, to bind and secure the whole.

How the
Wound
should be en-
tirely healed.

LII. After this, when a white, even, thick Matter appears in the Wound, the Wound should be dressed as you shall see occasion; every Day, or every other Day, the superfluous Matter should be wiped away with a very light hand, and

and it is better to leave some behind than to treat the Wound roughly. For wiping the Wound roughly hinders the Growth of new Flesh: but a little Matter being left, performs the Office of Oil or Balsam, keeping the Parts moist. These Rules being observed, new Flesh will presently spring up, and the Wound unite.

LIII. But that nothing may be omitted which may seem necessary towards the perfect Cure of the Wound, the Surgeon ought to be industrious to procure an even Cicatrix. To this End it will be proper to dry by degrees, and to harden the Surface of the new Flesh, by the Application of dry Lint, covered with a tight Compress and Bandage. But when this is not sufficient, through a great Redundancy of Humours, it may be proper to use some of the drying Essences, or native Balsams at N. XXXIX, or drying Powders, such as *Tutia*, *Lapis Calaminaris*, *Mastichis*, or *Colophonium*. Rectified Spirit of Wine is frequently used for this Purpose with great Advantage, which carries a great astringent and drying Virtue with it.

How a Cicatrix is to be formed.

LIV. When you perceive any Uncleaness or Foulness in a Wound, that is, if the Flesh is putrid, fungous, black, pale, or livid, it must be well cleansed before you attempt to heal. Different Methods have been proposed to execute this Intention; the Antients used Honey in this Case, See CELSUS, Lib. V. Cap. 26. N. 22. But the Moderns apply a digestive Ointment, made *ex Terebintbinâ Vitell. Ov. q. s. subactâ cum Mell. Rosar. q. v. admist.* But where this is not strong enough for their Purpose, they substitute *Unguentum Ægyptiacum, vel Vini Spiritu dilutum, vel digestivo admistum.* Some in the room of this use *Unguentum Fuscum Wurtzii.* To these digestive Ointments you may very properly add a small Quantity of *Aloës* or *Myrrh*, or, if you require still more Strength, *Mercurius præcipitatus ruber.* But the use of *Aqua Calcis* is well known to be very beneficial as a Detergent, especially if you add to a Pint of this *Mercurii sublimati gr. xx. vel xxx.* which from its known efficacy for this Intention, is called by the Surgeons *Aqua Phagædenica.* Applications of this kind are to be continued till the Wound is entirely clean; and then you are to have recourse to the vulnerary Balsams, and the Method prescribed at N. L.

How foul Wounds are to be treated.

LV. If the new Flesh should be luxuriant, and rise up so as to prevent the Formation of an even Cicatrix, it must be taken down by the *Vitriolum Cæruleum*; or in the room of this you may use a Powder composed *ex Alumine usto, Mercurioque rubro præcipitato*; at the same time making a proper Pressure with the Plasters, Compresses, and Bandages, till the Parts are even.

How fungous Flesh is to be taken down.

LVI. The Patient should particularly observe a strict Regimen, with regard to his Diet and manner of Living; that by avoiding every thing, that produce Crudities or Acrimony, the Blood may be rendered pure and uncorrupted. For nothing forwards the Cure so much as a good Habit of Body; which may be procured by observing a strict Regularity with regard to Diet, consulting which is the most proper Air to live in, keeping the Passions under, and neither indulging in too much Sleep, nor suffering too great Watchfulness. The greater Tendency there is in a Patient to a diseased State of Body, so much the stricter Course of Life ought he to observe.

Rules to be observed by the Patients

LVII. As to the Air, it ought to be temperate, and the Chamber should be equally guarded from Excesses either of Heat or Cold; for this Regulation is of Consequence in all Wounds, but most wonderfully so in those of the Head.

What Air is best.

If

If the Patient is in any Danger of suffering from the Dampness of his Situation, it will be very proper to burn Amber, Frankincense, and Mastich round him, to dry the Chamber. If he is in Danger from the Heat of his Situation, the Floor should be frequently sprinkled with Water.

What Diet
is best.

LVIII. All Intemperance in Eating and Drinking is most diligently to be avoided. That sort of Food is best which is most readily digested, for it makes a thin light Chyle and good Blood, which wonderfully assists the Wound in healing. For this Intention various sorts of Broths may be recommended to the Patient, particularly those that are made *ex Hordeo, Avenâ, Mannâ, Oryzâ, Scorzonerâ, Lactucâ, Endiviâ, Chærophyllo, Petroselino, Cichorio, Asparago*. He may eat Veal or Lamb, Pullets or Capons, Ale thickened with the Yolks of Eggs, ripe Fruits, particularly Apples, Cherries, or Plumbs; Vegetables also of several sorts well boiled, to wit, *Spinachia, Lupulus, Asparagi, Cinaræ, Lactucæ*, and most Pot-herbs. But Persons of strong athletic Constitutions, that cannot be satisfied with Diet of this kind, may be indulged in a more nourishing one, if they are attended with no violent Symptoms: But wherever there is any degree of Inflammation, the Patient must entirely abstain from Flesh, and all solid Food. Wounded Persons should constantly avoid admitting any thing *sharp, salt, or spicy* into their Diet: For they give a Sharpness to the Blood, and increase its Heat and Motion, and consequently occasion Hæmorrhages, Fevers, and Inflammations. They should therefore abstain, especially if they are of a hot Constitution, from every thing that is seasoned, from Mustard, Horseradish, and Onions. *All Meats that are difficult to digest, and breed a thick Blood,* should also be denied; such are all fat Meats, Lard, Bacon, Geese, Beef, either salted or cured, in the Smoke, Peas, Beans, and Lentils, especially after they are dried, and all things of this kind.

What Drink
is best.

LIX. The Patient's *common Drink* should never be strong: Therefore he should be forbid the use of Wine, Spirituous Liquors, Mead, Strong Beer, &c. The smaller his Drink is, by so much is it the wholesomer. But in this Case we must always have a regard to the Constitution and Custom of the Patient, and the Nature of the Wound. If he has been used to drink Water, he may go on in the constant use of it, or drink in its stead a Decoction of Bread or Barley mixed with Liquorice, Anised, Fennel, or Citron Peel. Those who dislike Water may be indulged in good Small Beer, that is neither too new nor too stale: But if the Patient is in great Danger, and of a weak Habit of Body, you may prescribe him a particular *vulnerable Drink*, to correct the vitiated Fluids: But of these we shall treat more largely below, at N. LXIII, and LXIV.

Of Rest,
Motion,
Watchful-
ness, and
Sleep.

LX. The best Remedy for a wounded Person is *Rest*. Therefore he should be indulged in it, especially with regard to the lower Limbs: For to walk, or even to move, is very pernicious. There are many Instances of wounded Persons who have not only suffered grievous Injuries, but even Death itself, by violent Motions of the Body. Nor is too great Watchfulness of less Consequence to the Patient: Therefore if Nature denies necessary Rest, it must be procured by the Assistance of Medicines. To answer this Intention you may very properly prescribe *Syrupi Papaveris albi ℥ss ad ℥i ex Aq. Primulæ veris, vel Cerasorum nigror. vel ex Emulsione Papaveris Semine, & Amygdalis dulcibus confecta*. When this appears to be too weak for the desired End, you may give *Theriaca Venet.*

Venet. vel Confectio Mithridatii ad ℥i. vel ℥ii. vel Opii puri gr. i. in one of the Vehicles we mentioned above.

LXI. *The Bowels should by all Means be kept open*, especially in those who have received a Wound in the Head, for they are subject to great Heat of Body, and are very apt to be bound. But observe in this Place, that strong cathartic Medicines are to be avoided, for in so weak a State of Health they are of very ill Consequence. But it is not only safe, but adviseable to eat and drink those things, that may at the same time nourish and keep open the Body. To this End the Patient may drink plentifully of *Tea* or *Coffee*, or may eat stewed Prunes; roasted Apples also and Raisins may be eaten for the same Purpose: but hard Meats of all kinds are to be forbid. Where the Patient is so bound up, that a Diet of this kind has no Effect upon him, it will be necessary to have recourse to Medicines, but to those of the mildest kind: you may here give a gentle Clyster, or use a Suppository, or prescribe a Solution of an Ounce or two of *Manna*, or *some purging Salts*, in warm Broth, or a Draught composed of *Tamarinds*, *Sena* and *Manna*. But you must carefully avoid all resinous and heating Medicines.

The Bowels should be kept open.

LXII. *Violent Passions of the Mind*; such as Anger, Fear, Sorrow, Pensiveness, and particularly Lust, should diligently be avoided; and a quiet, serene, easy, chearful State of Mind preserved; the contrary of which will never fail to bring on dangerous Symptoms.

The Mind should be free from Care.

LXIII. Whenever the Violence of the Wound, or the ill Habit of the Patient, require the use of *internal Remedies*, vulnerary Drinks will be found to be of the greatest Consequence in this place; in composing of which, the Constitution of the Patient, and the Nature of the Complaint should be diligently consulted: For they are in a great Error, who, according to the Custom of common Surgeons, give one kind of vulnerary Potion for all sorts of Wounds, and in all Habits of Body. For if your Patient is of a phlegmatic Habit of Body, cold, pale, naturally subject to Tumors, then the vulnerary Decoction should be composed of Herbs that will attenuate and divide the Blood; such as the *Radices quinque aperientes*, *Rad. Caryophyllat.* *Fenicul.* *Gramin.* &c. *Herb. Sanicul.* *Alchymyll.* *Agrimcn.* *Bettonic.* *Veronic.* *Philosellæ*, *Pervinc.* *Virgæ Aurææ*, *Sophiæ Chirurgorum*, *Semen Anisi*, *Fenicul. Dauci*, &c. The Drink is prescribed in the following Manner: Take two or three Handfuls of any of the before-mentioned Ingredients, boil them gently for a few Moments in six Pints of Water, strain it, and sweeten it with some proper Syrup, such as the *Syrupus Tunic.* *Betonic.* *Capill. Ven.* *Rad. quinque Aperient.* *De Cinnam.* &c. Give a Draught of this three or four times in a Day. You may also give Infusions of the same Herbs, and made after the manner of *Tea*, sweetened with Sugar.

What internal Medicines are to be given.

LXIV. Some Persons have a thin, sharp Blood; in this Case it will be proper to advise Decoctions of viscous glutinous Plants; such as the *Rad. Symphyt.* *Liquirit.* *Polypod.* *Scorzoner.* *Sarsaparill.*; *Herb. Malv.* *Althææ.* *Verbasc.* *Parietar.* *Mercurial.*; *Flor. Malv.* *Althææ.* *Verbasc.* *Dactyli.* *Ficus*, *Fujubæ*; which may be prepared in the Manner we have just described, with the Addition of some of the *Syrup. Alth.* *vel de Symphyt.* *Liquiritiæ*, *vel Papaveris*, to give it an agreeable Taste, if the Patient have no Aversion to Sweets. But if he is afflicted with great Pain or Wakefulness, then, besides the Methods which we lay down at *Chap. II*, too alleviate Pain, you may give an Ounce or two of the

Vulnerary Drinks for a thin, sharp Blood.

Syrupus

Syrupus Papaveris albi vel de Meconio, mixed with the beforementioned vulnerary Drink, or with Emulsions *ex Amygdalis & papavere albo*.

Remedies a-
gainst Acri-
mony and
Heat.

LXV. If the Patient should be troubled with any Acidity, you may give him Powders every Day *ex Lapid. Cancrorum, vel ex Matre Perlarum, vel ex Conchis preparatis*, or any other Absorbents. But when you perceive a Quickness of Pulse, and an extraordinary Heat, they are sure Signs of a Symptomatical Fever: To relieve or take off which, the following Remedies will be found of Service. Give Barley Water with the Addition of some Tamarinds, and *Syrupus Mali Citrei vel Ribesiorum*; or some of the Powders mentioned above, saturated with Citron Juice, with the Addition of a small Quantity of Nitre. But in this Place it will be very proper for the Patient to lose some Blood, more particularly if he is young and full of Blood, or if the Pulse is strong and hard. In these Circumstances a *Physician* is more proper to be consulted than a *Surgeon*. But if the Patient is robust, and of a sound Habit, the best common Drink that can be prescribed, is Barley Water, or good Small Beer. What has here been said with regard to the Regimen to be observed by the Patient, as well with Respect to Diet as Medicine, I think is sufficient; and I heartily recommend the Observance of these Rules to all wounded Persons, but more particularly to those who are to undergo severe Operations in Surgery; such as Trepanning, Lithotomy, Extirpation of the Breast, Amputation of a Limb, or large Tumors. Whenever we shall have Occasion below to speak of the Regularity that Patients ought to observe in their Diet, I hope the Reader will endeavour to recollect what has been said upon that Head, that we may not be obliged to make tedious Repetitions.

CHAP. II.

Of the Disorders accompanying WOUNDS, commonly called the SYMPTOMS of WOUNDS.

I. Of an HÆMORRHAGE.

An Hæmor-
rhage how to
be stopped.

I. PROFUSIONS of Blood attending Wounds, all arise from Injuries of the Veins or Arteries. The Violence of the Hæmorrhage will be in Proportion to the Size of the wounded Vessel. Whoever considers this, will no longer wonder at the dreadful Consequences attending this Symptom, unless there be immediate Assistance; such as great Weakness, fainting Fits, and sometimes instant Death. No Surgeon therefore ought to be without a present Remedy to stop Blood. Though there are some Cases where it is by no means proper to restrain the Hæmorrhage instantly: For in a young, plethoric Habit, or where the Wound has been received in a drunken Fit, or in a Fit of Passion, it is best to let the Blood run, as long as it continues to do so without bringing on any Inconvenience upon the Patient: For by a moderate Loss of Blood, the Inflammation, Tumor, Pain, and Fever are prevented, or much lessened.

1. By dry
Lint.

II. There are various Methods proposed to stop an Hæmorrhage. If none of the larger Vessels are wounded, you have your Remedy at hand, to wit,
dry

dry Lint, which you are to fill the Wound with pretty closely, covering it over with large Compresses, and making a proper Degree of Pressure over all with Bandages, and with your Hands: For more Service is frequently done in this Case by making a proper Pressure upon the Part with the Dressings, and with your Hands, than could be effected with more violent Remedies. But you must avoid too strict a Pressure; which often produces violent Pains, Inflammation, and at last even a Gangrene.

III. But if the Hæmorrhage is too large to be stopped by the Application of dry Lint, then *astringent Medicines* are to be called into Use. With this Intention the Ancients applied Rags to the Wound, which were dipped in cold Water or Vinegar, and covered them with Compresses wet with the same Liquors. Amongst the Surgeons of later Date, a certain Fungus called *Lycoperdon*, or vulgarly *Lupi Crepitus*, has been highly extolled for this Purpose: The Wound is filled with this in the room of dry Lint, and afterwards dressed up in the same manner as we directed above. The most common Remedy at present is *Spirit of Wine highly rectified*; this is applied cold to the Wound, filling it up with Dossils dipped in the same Spirit, and covering it with large Compresses wrung out of the same Liquor, making a proper Pressure over all with the Bandage. The same Virtues used to be ascribed to *Oil and Spirit of Turpentine*, applied in the same Manner as the Spirit of Wine. To this End also strong Solutions of *Alum*, *Vitriol*, or *Saccharum Saturni in Aquâ Plantaginis*, were recommended by many. Some dissolved Alum and the Vitriol together in the same Water, or, where they would have it of more Force, in Phlegm of Vitriol. Others make a styptic Liquor *ex Vitriol. Alb. ℥ i, & Aceti fortissimi ℥ iii*, applying it in the foregoing Manner. In this Place we are by no means to omit the Mention of *astringent Powders*: such as are made *ex Bolo Armeni, Lapide Hæmatite, Sanguine Draconis, Croco Martis astringente, Terrâ Japonicâ, Aloë, Olibano, Mastiche, Granat. Corticibus, Alumine, Saccharo Saturni, Terrâ Vitrioli dulci, Gipsso, Hepate, Vitulino tosto*, and several other Medicines of this Kind, either alone or mixed in different Proportions, and sprinkled, plentifully upon the Wounds, dressing them up with Lint, Compresses, and Bandages, as above.

IV. When Vessels of a larger Size are divided, it is usual to apply *caustic Medicines*, which act by their great Astringency. The Medicine chiefly used with this Intention, and indeed the safest, is *Vitriolum Romanum*, which being coarsely powdered and sprinkled upon Cotton, is easily applied to the Wound, dressing up with Dossils, Compresses, and Bandage. The *Liquor Stypticus Weberi* is also used here, and others of the like Kind, which have Oil of Vitriol in their Composition: But those Dressings only which are applied to the Bottom of the Wound are to convey these Medicines, otherwise the neighbouring Parts would suffer too great Corrosion. Those Medicines which are ended with a stronger caustic Quality than these, such as *Mercurius Sublimatus, Lapis Causticus, Oleum Vitrioli, &c.* can never be used with Safety, because they are constantly attended with violent Symptoms, from their too corrosive Faculty.

V. But if these Applications prove fruitless, it will be proper to *divide entirely the Arteries which are only divided in part*, and occasion the Hæmorrhage: For by this means they will contract and hide themselves under the muscular Flesh, and the Orifices will be choaked up; at least they will more readily

yield to the Force of the Medicines recited above. This Method of Treatment is principally necessary in Wounds of the temporal Arteries, and of those of the Cubiti and Tibiæ.

5. By the
actual Cau-
tery.

VI. If this Method should also fail, you must have Recourse to the *actual Cautery*. The Orifices of the Vessels being burned, a Crust is formed over them, and this Method is so effectual, that it is scarce possible for an Hæmorrhage to happen in Wounds of the external Parts, but what may be stopped by it. You should in this Case always have two Cauteries ready, that if one should be extinguished before the Operation is finished, you may be prepared with another. Cauteries are made of very different Shapes and Sizes, according to the Parts to which they are to be applied: I have given you eight different Sorts, for different Uses, in *Plate III, Fig. 9 to 16*. There are two Inconveniencies which generally attend the Use of the Cautery, and sometimes force us to neglect it. For first, not only the Patient is wonderfully terrified at the Apprehension of it, but Mankind in general look upon it as a Piece of Barbarity to advise the Use of it: When, to say the Truth, it does not occasion such violent Pains as are usually apprehended from it; and what Pain there is in the Operation, is instantly over. But it is also attended with another Inconvenience of greater Consequence; that is, the Eschar, which is brought on by the Cautery, frequently falls off in two or three Days, especially in the larger Arteries, from whence a fresh Hæmorrhage succeeds, and most likely a deadly one. To prevent this, two things are to be observed: First to handle the Wounds tenderly at the Time of dressing; and secondly, to be provided always with a fresh Cautery, to repeat the Operation if necessary. This Caution is to be observed in the larger Arteries for fourteen Days: After this there is no greater Danger of a Return of the Complaint. But where the crural or axillary Arteries are wounded, the Cautery will be of no Service.

6. By Liga-
ture.

VII. In very dangerous Wounds of the large Arteries, such as the crural and axillary, and in Amputations of the Limbs, the safest Method is that of making a *Ligature* round the Vessels. If this is performed by passing a strong waxed Thread under the Artery by the Help of a crooked Needle, the Blood is presently stopped, and the Orifices of the Artery coalesce. Or it is sometimes taken up with a Forceps, the Thread wound round it, and the Artery is compressed.

7. By In-
struments.

VIII. Lastly, several Instruments have been contrived to stop Hæmorrhages in different Parts of the Body. Formerly a large Iron Ring, furnished with a Screw, was in great Use amongst the Surgeons; which they applied in such a manner to the wounded Limbs, that by tightening the Screw which pressed upon the Compresses, and other Dressings, it closed the Mouths of the Vessels, and stopped the Flux of Blood. You may see Descriptions of this Instrument in *SCULTETUS*. But as this was a very inconvenient Instrument, and could only be applied to the Limbs, the Surgeons found themselves under a Necessity of inventing a more convenient Instrument, that might be applicable also to the Arteries of the Neck or Head. An Instrument of this Kind you may see in *Plate V, at Fig. 2*. the Construction of which is as follows: A Brass Plate of three Fingers in Length, and two in Breadth, AA, is perforated in the Middle to admit a strong Screw, BB, which is provided at the lower End with a small round Plate, C: a Piece of Leather is strongly fastened to one End of the Brass Plate,

Plate, of equal Breadth with it, E E, F F: In violent Hæmorrhages this Instrument is fitted to the wounded Part, and the End F is, by Means of Holes that are made in it, fastened to the Hooks G G; so that the small Plate C may press exactly upon the Compresses and Dressings that cover the Wound. All things being thus prepared, the Handle of the Screw, D, is to be turned round gently till a sufficient Pressure is made to stop the Blood; and then it is to be left in that Condition for a Day or two. But it must be entirely left to the Discretion of the Surgeon, when he shall think it prudent to alter the Position, or entirely to take off the Instrument. An Instrument of this Kind, with a longer Belt, will serve in Wounds of the Head and Temples.

IX. When we are speaking of Instruments that are used to suppress Hæmorrhages, we must not omit the *Tournequet*, which we use with great Success after Amputations. There are several things required to form this properly. The first thing to be enquired after is a small Roller of a Thumb's Breadth, and about a *Paris Ell* in Length; in the next Place a little cylindrical Stick; then a conglomerated Bandage, two Fingers thick and four long; some Compresses of a good Length, and about three or four Fingers in Breadth, to surround the Legs or Arms. Lastly, a square Piece of strong Paper or Leather, about four Fingers wide.

X. We are now acquainted with the Nature of the *Tournequet*. It remains that we enquire which is the most convenient Manner of applying it. The rolled Bandage is to be applied to the Trunk of the wounded Artery lengthways, covering it in a contrary Direction with Compresses, surrounding the Leg, Foot, or Arm, as it were with a Ring. The Roller must be passed twice round these Applications, and fastened in a Knot, but so loosely, that you may easily introduce your Hand between it and the injured Part: The Leather or thick Paper must be nicely placed under it upon the external Part of the Leg, or Arm, and the Roller tightened by Degrees, by turning the Stick round, (which is to be introduced into the Knot) till the Hæmorrhage is entirely stopped. The Stick must be kept in this Situation till the Wound is properly treated, and the Return of the Hæmorrhage prevented by proper Remedies, or by taking off the Limb. When this End is acquired, the *Tournequet* is to be loosened, or entirely taken off, as the Surgeon shall think convenient. But where it is applied to the Arm, the rolled Bandage is to be placed near the *Axilla*, in the internal Part of the *Humerus*, and the Stick in this Case is to be fastened on the opposite Side; the Situation of the Artery requires this Position, See *Plate III, Fig. 1, Letter K*. When the Hæmorrhage happens in the Thigh, the Bandage is to be applied to the upper Part of the Thigh, or just over the Knee, as the Circumstances shall require, in the same Manner as before, See *Lett. L, M, N*. But that you may have a clearer Idea of the Figure and Position of the *Tournequet*, we have given you a Draught of it, at *Plate III, Fig. 2*.

XI. PETIT, a Surgeon of the first Rank in *Paris*, invented another *Tournequet* in the room of this, which is well enough known by the Name of the Inventor. It is said to have this Advantage over the other, that it will preserve its Situation without requiring the Attendance of an Assistant: And besides, that it may be left upon the Limb any given Time, without impeding the Circulation of the Blood: Whereas the common one entirely interrupts the Circulation of the Blood, and therefore cannot be kept on long. The Description that I have seen of it is so short and imperfect, especially as the Parts of which it is composed

are not described separately, that in many Places I could not understand it. GARENGEOT, *Tom. II. de Instrument. Chirurg.* differs a little in his Description of it, but he is by no means clear.

Our Improvement upon it.

XII. Therefore I have taken some Pains to correct it in the Manner you may see at *Plate V, Fig. 6*, AA describes the upper Part, BB the lower, and C the Screw; all in their natural Size, made of some strong Wood. At the Extremity DD there are two small Iron Screws, to which a strong Silk Roller is to be fixed, of the same width with the Instrument, but about twenty Fingers in length, that it may be long enough to encompass the largest Part of the Limbs, and be fastened at the small Hooks described at E. Both Extremities at FF are to be hollowed, that the Roller may lye quiet and firm. G describes an Iron Plate which is placed there to strengthen the Wood. The Wound therefore being properly dressed up, and the lower Part of the *Tournequet* guarded with a Bolster, is to be placed on the Side opposite the Wound; the Silk Roller is to be brought round the Limb, and being drawn very tight, is to be fixed to the Hooks E; and then by turning the Screw C, till a sufficient Pressure is made upon the Parts to stop the Flux of Blood, it must be left upon the Limb in this Situation, as long as the Surgeon shall deem it necessary. By means of this *Tournequet*, I have stopped an Hæmorrhage in a Wound of the crural Artery, and recovered the Patient without any Ligature or Amputation, in the presence of many Witnesses.

MORAND'S *Tournequet.*

XIII. GARENGEOT, in the second Edition of his Book of Chirurgical Instruments, describes another *Tournequet*, invented by MORAND of *Paris*, of which he has given us a *Plate at page 360*. This resembles the former in many Circumstances, but differs from it chiefly in this, that in the room of a simple Screw, MORAND has substituted a compound Screw, that takes Place sooner; this he makes always of Steel; and it acts more in one Turn than the other can in two or three. This you may see more largely described, if you consult the Author himself. But GARENGEOT makes some Exceptions to this Instrument, and prefers PETIT'S.

Another.

XIV. Some Years since, when I attended the Army, I was called to an Officer of Rank, who was dangerously wounded. I saw there a kind of *Tournequet* made of Iron, and very heavy, that much resembled MORAND'S, but differed from it in some things, I do not know by whose Direction: But as I have never seen it described before, I have given you a Plate of it, See *Plate V, Fig. 7*. A is the lower Part pierced all round the Edges with several *Foramina*, by which means it will admit of a Bolster or Cushion to be sewed to it. B is an Iron Barrel to receive the Screw. C is the upper Part. D is another Barrel fixed upon that, for the Reception also of the Screw. EE are the Extremities of the upper Plate, one of which is supplied with small Hooks, the other with large Hooks, and with an Opening also to pass the Roller through and fasten it, almost in the manner we have described it in ours of *Fig. 2, and 6*. F is a kind of Ring, surrounding the Screw, above the upper Plate. G is a square Body made like a female Screw, for the Reception of the small Screw H, and the great Screw IK, which would otherwise fall down, but by this means is easily kept up in the Box D. L is an Iron Cylinder, which is firmly fixed in the lower Plate, but is loose in the upper: This keeps the two Plates in the same Situation with

with each other, and at the same time admits the upper Plate to slide up and down freely, as occasion shall require.

XV. I endeavoured to improve this Instrument, and ordered one to be made of Brass after the Manner described at *Plate VI, Fig. 1.* In this the upper Plate AA, is much shorter than the lower CC; the Belt DD, is fixed at one End, and after it has been brought round the Limb, is fastened to the other End by small Hooks EE. The Belt passes through the lower Plate at both Ends by Holes made for that Purpose FF. The Instrument is by this Contrivance always kept even, and does not change its Posture upon the Action of the Screw B. The Reader may chuse which of these Instruments he thinks fittest for his Purpose; they will all answer the Intention they were made for; one does it sooner, the other takes a little more time. But this Proverb will always have its force, *Sat citò, si sat benè.* How the *Tournequet* is to be applied in Amputations of the larger Limbs, we shall shew in the proper Place.

An Amendment of my own.

XVI. Before we take leave of this Article, it may be proper to inform you, that in Wounds of the large Arteries, *the internal use of astringent Medicines will be of no service*; besides, they frequently occasion Pain, Inflammation, Fever, and other Disorders, by making Obstructions in the Lacteals, Mesenteric Glands, and other Vessels; therefore it is best to lay them entirely aside.

What is to be done by internal Astringents.

II. *Of PAIN in WOUNDS.*

XVII. Pain may be reckoned amongst the most grievous Symptoms that usually attend Wounds: for great Watchfulness, Weakness, Convulsions, Inflammations, Gangrene, and even Death itself, arise frequently from this Cause. The Causes of Pain are many. 1. Sometimes an extraneous Body is left in the Wound, which occasions great Irritations, especially in nervous Parts of the Body. 2. Corrosive Medicines, which are sometimes applied to stop the Hæmorrhage. 3. Or a large Obstruction of the Blood may happen near the Wound, and bring on Tumor and Inflammation: This frequently happens in Plethoric Habits of Body, or in Gun-shot Wounds, because in these Wounds there is usually but a small Discharge of Blood. 4. Lastly, Wounds, or Tension of Nerves or Tendons may well be reckoned amongst the principal Causes of Pain.

Of Pain in Wounds.

XVIII. It will be well worth our while to consult the Cause of Pain, that we may remedy it with the greater Ease: For all Pain will not admit of the same Remedy. Therefore, 1. *If any extraneous Body is left in the Wound*, the first Intention is to remove it, in the manner we taught at N. XXXI, XXXII, XXXIII. 2. *If the Pain arises from the Application of any corrosive or astringent Medicine*, it must be removed, or at least moderated. This Intention will be answered by warm Milk, the Decoctions *ex Malvâ, Althæâ, Floribus Chamæmel. Sambuc. Melilot. Verbasc. Sem. Lin. Papav. &c.* The Wound should be cleansed with a Sponge expressed from Decoctions of this kind, till nothing corrosive remains in it, and till the Pain is removed. Cataplasms may be applied warm to the Wound, made of the foregoing Herbs. There are other Medicines also which Physicians prescribe to be given internally to assuage Pain, as anodyne Emulsions. 3. *When the Pain arises from the Violence of the Inflammation*, which is frequently the Case, it will be proper to bleed as largely as the Strength of the Patient will allow: but if you cannot draw a sufficient Quantity, you must scarify the Part, as near the Wound as is convenient, especially in Gun-shot Wounds.

Of Remedies for Pain.

By

By this Method the stagnating Blood is set at liberty, and the Inflammation and Pain are instantly relieved. In the mean time, you may foment the Wound *cum Oxycrato vel Spiritu Vini Camphorati*; or, which is much better, *cum Aquâ Calcis Vivæ modica portione Spiritus Vini Camphorati commist.* Emollient Cataplasms, and such Applications as we shall more largely treat of when we come to speak expressly of Inflammations, take place here. Absorbents should be taken inwardly, such as *Lapis Cancrorum, Conchæ præparatæ, Antimonium Diaphoreticum*, mixed with a moderate Proportion of *Nitre*. All things should be forbid that increase the Circulation. Lastly, 4. *Where the Pain arises from an Injury of the Tendon or Nerve*, the Cure is very difficult: For this Case is always attended with violent Inflammations and Convulsions. To prevent ill Consequences that may happen in Wounds of this kind, it will be proper to dress with *Balsam. Peruv. Balsam. Copaib. Ol. Terebinth. vel cum misturâ ex Ol. Terebinth. & Aq. Regin. Hungar. confect.* These Medicines should be moderately warmed before they are applied to the Wound, laying a Cataplasm over the Dressings, composed *ex Herb. Scord. Absinth. Abrotani, Flor. Sambuc. Chamæmel. &c. Vin. q. s. decoctis.* Internal antispasmodic Medicines should by no means be neglected in this Case. If the Pain is not lessened by these Remedies, there is great Reason to despair, unless the wounded Part of the Nerve be instantly divided; for although this Method deprives all the Part of the Limb that lyes below the Division of the Nerve of Sense and Motion, yet in such a desperate Case it is better to lose the use of a Limb than Life itself.

III. Of SPASMS and CONVULSIONS.

Convulsions,
from
whence.

XIX. Spasms and Convulsions are brought on many ways: For they not only arise from all the Causes that occasion Pain, but frequently from too great loss of Blood. This appears from the many Examples of Men, and other Animals, that have died by the Violence of the Hæmorrhage. All these before they expire fall into strong Convulsions and Distensions of the Nerves. HIPPOCRATES mentions this as the worst of Prognostics, *Alph. 2. Sect. 5.* "Convulsions, succeeding a Wound, are mortal."

How Con-
vulsions are
to be cured.

XX. In order to remedy these Disorders, it is necessary first to discover their Cause. Whenever Convulsions are occasioned by extraneous Bodies, by corrosive Medicines, or by wounded Nerves, the same Methods are to be followed, which we advised for the Relief of Pain from the same Causes at N. XVIII. If they are occasioned by *Inflammation or Fullness of Blood*, Blood-letting will generally bring Relief, especially if we use at the same time the emollient Remedies advised at N. XVIII. If they are occasioned by *an immoderate loss of Blood*, Blood-letting is to be avoided, notwithstanding some amongst the *French* advise it in convulsive Disorders arising from what Cause soever, See GARENGEOT, in his *Chirurgie*, Chap. 2. In this Case it will be better, by the Methods before advised, to stop the Blood, and to give the Patient warm Broth, warm Milk, and Draughts of warm Ale thickened with Yolks of Eggs, and sweetened with Sugar; by this Method the Vessels are filled again by degrees, and the Cause ceasing, the Convulsions go off. In the mean time strengthening Medicines should by no means be neglected, particularly a Wine, Emulsions, and strengthening Drinks.

^a See CELSUS, B. V. Ch. 26. N. 25.

IV. *Of the SYMPTOMATICAL FEVER.*

XXI. If the Patient has a quick Pulse, and an increased Heat, we say he has a *symptomatic Fever*. This Fever is of very dangerous Consequence, and will quickly prove mortal, if not timely relieved by the Assistance of the Physician. Symptomatic Fever, what.

XXII. In order to cure Fevers of this Sort, the Physician should forbid the Use of every thing, both in Medicine and Diet, that may encrease the Heat; and order small Liquors to be drank plentifully, such as Barley Water, thin Gruels, Ptisans, &c. cooling Powders mixed with Nitre and Camphire should be prescribed. The Bowels should be kept open with Clysters, if they do not answer naturally. Where the Patient has lost but a small quantity of Blood, and is of a plethoric Habit, it will be right to open a Vein on the opposite Side to the Part wounded. A very thin Diet is to be advised, as *Decoct. Hordei*, &c. and in small Quantities at a Time. Flesh, and all solid Diet and Spices, should be absolutely forbid. Cure of the Symptomatic Fever.

C H A P. III.

Of GUN-SHOT WOUNDS.

I. **G**UN-SHOT Wounds are attended with much worse Consequences than Wounds that are made by sharp Instruments: For, besides the Effusion of Blood, the Parts are more shattered and torn, especially when the Shot falls upon the Joints, Bones, or any considerable Part. Gun-shot Wounds.

II. The Antients were entirely unacquainted with Wounds of this sort, as they fought chiefly with sharp Weapons, as Swords and Spears; or with Clubs, &c. For the Use of Gun-powder was not known till about three Centuries ago. Although many of the Ancients make Mention of Bullets, and of their being used in Engagements, yet they had neither Guns nor Gun-powder: On which Account they could not drive them with such Force as the Moderns: For they either hurled them with a Sling, or shot them from a Cross-bow. Whether known to the Antients.

III. Wounds of this Kind have a Crust or Eschar formed upon them, and therefore are attended with little or no Hæmorrhage at first, unless some considerable Vessels are wounded. But as soon as the Eschar falls off, the Hæmorrhage is sometimes so violent as to endanger the Life of the Patient, unless a Surgeon is at hand. For the five or six first Days there is little or no Discharge of Matter: Therefore it is not to be admired at, if Gun-shot Wounds, while the Vessels are compressed by the Eschar, exceed all others in Violence of Symptoms, such as Inflammation, Pain, Gangrene, &c. Discharge small quantities of Blood and Matter.

IV. The Eschar which is formed upon these Wounds is not occasioned, as many have imagined, so much by the Heat of the Bullets, as by the Rapidity with which they destroy the Parts, and the Violence of the Symptoms is owing chiefly to this Rapidity, whence ensues a violent Contusion; and to the extravasated Blood being long confined under the Crust. Formerly they were of Opinion, that there was something poisonous in Wounds of this sort, but in this also they were mistaken, for nothing poisonous enters the Composition, either of the Powder or Ball. So far from it, that the Powder is used medicinally in acute Fevers.

V. Gun-

How many
Differences.

V. Gun-shot Wounds are some of them deep; some shallow, which only affect as it were the Surface of the Body, and perhaps take off a Piece of Skin or the Fat at farthest: These are attended with less Danger, and generally with less Pain. In some the muscular Parts alone are wounded, in others the larger Veins and Arteries, which often discharge such a Quantity of Blood, as to endanger the Life of the Patient. Sometimes the Ball passes clear through; sometimes it remains fixed in the Wound, and frequently carries Part of the Cloaths or Wadding with it. From the Difference of these Circumstances different Symptoms arise. In others, again, the Bones are injured either by Collision or Fracture; and that sometimes in the Body of the Bone, sometimes in the Extremes or Joints. Whence commonly arise the worst of Symptoms; and the Patient fares well, if he loses only the Limb, and not his Life into the Bargain, especially if the Joints of the Tarsus, Cubitus, Knee, Shoulder, or Thigh be violently shattered; unless the wounded Part, which is indeed almost the only Remedy, be cut off in Time. Gun-shot Wounds, which happen to the Viscera, or the Contents of the Head, the Thorax or the Abdomen, as they fall on the nobler Parts of the animal Œconomy, generally end in Death, if not instantly fatal.

Of Wounds
in the Cra-
nium.

VI. Gun-shot Wounds, which affect the Cranium or Scull and the temporal Muscles, are for the most part attended with great Danger: For even those, that appear very slight externally, frequently bring on terrible Symptoms, by the Concussion of the internal Parts which they occasion. For dangerous Fissures are often produced, of worse Consequence than even Fractures themselves: Because by this means the internal Laminæ of the Cranium are shattered; or the Veins and Arteries of the Brain burst, in which Case the extravasated Blood has no Vent, nor can the Splinters of the Cranium be extracted. Death therefore must be the Issue, unless prevented by the Trepan. If the Ball is lodged in the Brain, the Patients almost universally die: But, if it has pierced only one Side of the Brain, they may recover; which has been seen in Practice by myself and others. Yet all Injuries whatever of the Cranium and the temporal Muscles, are attended with great Danger, on Account of the Nerves and Arteries in those Parts, and are therefore to be treated with great Care and Circumspection.

Of Wounds
in the Tho-
rax and Ab-
domen.

VII. In the Thorax, if the Heart, or its Auricles, &c. if the pulmonary Artery or the Aorta, the Trunk of the Vena Cava or the pulmonary Vein, or any of their larger Vessels are burst, they are generally mortal. But if no large Vessel is wounded, you need not despair of a Cure; though the Patient is often troubled with a Difficulty of Breathing. If any Viscus of the Abdomen is pierced by a Ball, as the Ventricle, Intestines, Liver, Spleen, &c. or any large Blood-vessel, in its Contents, Death must be expected. But if the Liver, Spleen or Kidneys are only superficially wounded, the Patient frequently recovers. So, if the Bladder should be injured in the Part situated without the Peritonæum, these Wounds are generally healed. But, if the Ball rest in the Bladder, it occasions such an Accretion of calculous Matter, that the Patient cannot be cured without cutting.

Cure of
Gun-shot
Wounds.

VIII. In the Cure of these Wounds, the Surgeon must in the first Place examine, whether the Wound be slight, or of a dangerous Kind. We term it slight, if the external Parts only are hurt, such as the common Integuments, or part only of a Muscle, wherever situated; if the Bones are not affected, and if
it

it be pervious. In these Cases, if there be no Hæmorrhage, the Crust is to be removed by Suppuration. To effect this, the best Method is, first to dress the Wound with soft Lint and a Compress; the second or third Day to fill it up gently with a digestive Ointment, or with Honey, as a most excellent Suppurative; then cover it with a Plaster and Compress, or a Compress alone; and lastly, to secure it with a Bandage. If such a Wound should be received in a Part, where Compresses and Bandages cannot conveniently be applied (as for Instance, on the Face) it will be sufficient to secure the Lint with a Plaster only. Let this Dressing be continued either every, or every other Day, till the Crust is separated, the Wound cleansed and incarned; and the Cicatrix will be happily formed by the Application of dry Lint.

IX. When the Crust is removed, they generally apply balsamic Medicines; as all native Balsams, or Oil of Turpentine, or the *Eau d'Arquebuse*, which Method we by no Means disapprove; though indeed Wounds of this Kind are easier healed by being left to Nature, especially in sound and robust Constitutions. If any of the soft Parts are taken off by a large Ball in the Surface of the Thigh, Calf, Side, or Arm, the same Method of Cure is to be followed. If the Suppuration be too abundant, or the Flesh luxuriant, these Mischiefs must be removed by burnt Allum and red Precipitate; and the Wound must be dressed with Oil of Turpentine, *Bals. Copaiv.* or some balsamic Essence, as Amber, Myrrh, &c. or sometimes with dry Lint only. There are Cases, where the proud Flesh may be removed with the Finger. But in larger Wounds, when the Crust is cleared, you should avoid digestive Medicines, and apply nothing but spirituous Balsamics.

X. If there happen in these Cases a violent Contusion or Inflammation, there is no better Method (especially if the Patient has lost little or no Blood by the Accident, and is of a plethoric Habit) than to make a wide and deep Incision in the Wound, the Neck only excepted, on Account of the large Vessels. After a sufficient Discharge of Blood, the Incision should be dressed with fine dry Lint, Compresses well saturated with warm Spirit of Wine, and a proper Bandage. If there has not been a sufficient Discharge, Venesection must be applied in plethoric Constitutions.

XI. But if an Hæmorrhage arise from a Wound in the fleshy Parts, it is a certain Sign that some large Vein or Artery is injured; for the small Vessels seldom bleed. In this Case styptic and balsamic Medicines, nay, the *Alcohol Vini* is always prejudicial; for they constrain the bruised Parts, check the Circulation, and of consequence either cause an Inflammation, or increase it; and too commonly pave the Way to a Gangrene and Mortification. Or, if Stytics should perhaps be particularly necessary, I would advise the *Nodus ex Vitriolo*, or a small Compress dipped in the Styptic of WEBER or RABELIUS to be applied only to the Lips of the wounded Vessel, and pressed down with the Finger, till it produces a Scar, and the Blood is stanch'd. For these Wounds will bear the Application of much Lint, or the Stricture of Bandages. But the best and safest Way, is to close up the Mouth of the wounded Vessel with a Needle and Thread.

XII. In Wounds of the large Arteries (the Situation of which the skilful Anatomist is not unacquainted with) that the Patient may not be lost by a violent Hæmorrhage, it is expedient, first to compress the Artery with your Thumb, then

then apply the *Tournequet* to the wounded Limb, and by constringing the Trunk of the Vessel, stop the Discharge: After this, you must take it up by means of the crooked Needle (*See Ch. II, N^o, VII.*) But, if from the Narrowness of the Wound you cannot get at the injured Vessel, it must be enlarged with the Scalpel, in order to reach the Artery and bind it up, or stop the Hæmorrhage by the Application of Styptics. The Wound should afterwards be dressed with dry Lint, Compresses, and a Bandage. Nor should these Dressings be renewed till the third or fourth Day, nor the Lint be removed for Fear of a fresh Hæmorrhage; but let it remain, till it quits of its own accord.

Gun-shot
Wounds of
worse Con-
sequence.

XIII. But there are Gun-shot Wounds of worse Consequence than these. To which Class may be referred, 1. Those where the Balls have not passed through; or where they, and other Bodies forced in with them, remain in the Part. 2. Where the Bones are at the same Time broken or shattered. And, lastly, where the Viscera, and larger Vessels, or within or without their Cavities, are wounded; from whence arise very dangerous Hæmorrhages.

The general
Method of
treating these
Wounds.

XIV. In the Treatment of these Wounds we must have Regard both to the Wounds themselves, and the Accidents attending them. As to the Wounds themselves, six Particulars are to be observed. As (1) If we perceive that the Ball has not passed through, which is plainly demonstrated by a single Aperture; in this Case we must endeavour with all Speed to extract the Ball, or other foreign Bodies forced in with it, such as Cloaths, Wadding, &c. The same also is to be regarded with respect to Splinters of Bones: For, before these are removed, you in vain attempt to heal. (2) If there be a violent Hæmorrhage, it must be stopped by the Method abovementioned; but if it be slight, and from the smaller Vessels, it is scarce worth attending to. For in the first Place it is often serviceable in plethoric Habits, by lessening the Quantity of Blood, and thereby preventing Tumors and violent Inflammations; and it generally stops of its own accord; or is easily checked by applying dry Lint or a gentle Astringent. (3) Bruised and corrupted Flesh sticking in and about the Wound (which is called a Crust or Eschar, if but a little) is easily taken off by a digestive Ointment, and Spirit of Wine, impregnated with *Sal Ammoniac*: If much, it cannot be removed without deep Scarifications and suppurating Medicines. (4) The Void of the Wound must be filled up with new Flesh: (5) An even Cicatrix be formed: And (6) If any Bones are broken, they must be united.

Extraction
of Balls and
extraneous
Bodies.

XV. With regard to the Extracting of Balls or other foreign Bodies, the Surgeon should immediately enquire, except there be a violent Hæmorrhage, if any thing of that Kind remain in the Wound, and where. But here we must observe, that Balls, Stones, and other hard Bodies are easier discovered by the Finger, or Probe, than Fragments, or Cloaths, or Wadding: For these last, from their Softness, and the Redness occasioned by the Blood, are very difficult to be distinguished from the membranous and muscular Parts, either by the Sight or Touch. But, to be surer in this Case, it is always useful, nay, generally necessary, to enlarge the Wound, and scarify; carefully avoiding the larger Veins and Arteries, but not regarding the smaller, the Nerves, or the Muscles. This you must do, till you come at the foreign Bodies: The Extraction of which should be performed, if possible, with the Hand; or, if that cannot be done, with a Forceps, or Hook, *See Plate III, Fig. 3, 4, 5, 6, 7, 8.* They are easiest removed at first: For after some Delay the Tumor and Inflammation of the

Parts

Parts render it difficult and painful. Besides, Bullets will by Degrees work themselves deeper, and be buried under the Muscles: Which will occasion Fistulæ, Rigidity of the Limbs, and other Inconveniencies. In extracting Balls that lie deep, you must take great Care not to lay hold of Blood-vessels, Nerves, or Tendons; which Accident will be avoided by introducing the Forceps shut, and not opening them till you feel the Ball.

XVI. When a Bullet is lodged in a Bone, we must endeavour to extract with the Forceps or Hooks, (*See Plate III, Fig. 8.*) If it lie too deep for these, we must have recourse to the Trepan, as described *Plane III, Fig. 7.* or *Plate VII, Fig. 7. Lett. B.* But if this will not avail, LE DRAN advises immediate Amputation. Yet in my Opinion, unless in Cases of great Extremity, we had better leave the Ball, till the Parts suppurate, and set it at Liberty. Sometimes the Ball is removed by trepanning: Sometimes it remains a long while in the Bone without any Danger or Inconvenience: A remarkable Instance of which, I remember in an Officer, who for many Years carried a Bullet in the Middle of the Tibia, that gave him no Trouble. Whence it appears, that we should not be too hasty in proceeding to Amputation. But if a Ball, or any other extraneous Body, be lodged in the Joint between two Bones, CELSUS (*Book VII, Ch. 5.*) has very judiciously advised, to extend the Joint with your Hands, or by the Means of Bandages and Slings, as in the Case of Luxations: By which the Ligaments being loosened, Room is made between the Bones, for the easier Extraction of the foreign Body. I have often wondered that this excellent Precept of that great Physician should be so generally neglected by the Moderns, as a thing of no Consequence.

Of Balls in the Bones or Joints.

XVII. Whenever the Ball has penetrated so deep into the wounded Part, as particularly in the Arm, Thigh, Thorax, or Abdomen, that you can easily feel it with your Finger on the Side opposite to the Wound, the Surgeon should examine nicely whether it is safest to bring it back by the way it went in, or to make an Opening upon it, and draw it out at the opposite Side. When the Wound cannot be enlarged without Danger of injuring the neighbouring Parts, you should search for it with the Probe; and endeavour, but with great Caution, to extract with the Forceps, or some other convenient Instrument.

Of Extraction on the opposite Side.

XVIII. If the Wound is attended with fractured Bones, after the necessary Incisions have been made, what Fragments are loose, whether in the Cranium or elsewhere, should be gently removed. If these Fragments should adhere to the principal Bone by their fine Membranes, they must be cut off; and the larger Parts of the Bone, that are not much injured, be reduced to their natural Position, and retained there by proper Dressings, as in other Fractures. Where any Splinters stick out, which hinder the Reduction, and hurt the neighbouring Part, you should break them off with the Forceps. If the Bones of the Tibia or Femur are broken, after they have been cleared of the extraneous Bodies, and reunited in the best Manner, they are to be dressed with the eighteen-headed Bandage, and reposed in the Straw-couch, (*Fr. Fanones*) or in PETIT's Machine, as in other complicated Fractures. Where a Wound is inflicted by a spent Bullet, or the Fragment of a Grenade, and the outward Integuments are not penetrated, though the Bone be broken; in this Case worse Consequences are to be expected from the Violence of the Contusion. Therefore, to free a Passage for the extravasated Blood, we must make deep Incisions in the Integuments and Muscles,

Of the Cure of fractured Bones.

Muscles, but not quite to the Bone. When the Blood is thus discharged, the broken Bone should be replaced, and, if possible, dressed with the eighteen-headed Bandage. But Wounds of this Kind, especially from large Pieces, generally take off the whole Limb, and too often the Patient himself.

Further Observations on Wounds in the Bones.

XIX. If the Joint be contused, and there be no Wound nor Fracture of the Bone, lest dangerous Symptoms should arise from any Injury of the Ligaments, Nerves, and Tendons, your Incision must be only in the Integuments and fleshy Parts. But if a noxious Humour be found in the Joint, the Ligaments also must be cut to let it out. Venesection and a proper Regimen are here very necessary, not without the Use of internal resolving Medicines, and powerful Externals. But if the Bones in the Joint are broken or shattered, the Limb can scarce be saved, nor the Patient himself, unless you take it off a little above the Wound. In Contusions of the Bones without a Fracture, if, after proper Incisions, a violent Pain remains in the Bone; if the neighbouring Flesh is pallid, the Bone of a darkish Colour, with a large Suppuration; in this Case either the Limb must be taken off, or, as LE DRAN advises, the Bone must be trepanned upon the Wound, to open a Passage for the confined Matter. If, in this Case, the Pains are very acute, unless you amputate, the Patient generally dies convulsive. The broken Bone, when rejoined and properly dressed, should be constantly kept in an elevated Posture.

In Case of Delay.

XX. If a Surgeon be not timely called in, and the extraneous Bodies remain long in the Wound, from whence arise Tumors, Inflammations, violent Pains, and other bad Symptoms; the Lips of the Wound must be greatly enlarged, and deep Incisions made in the Tumors. By this Means you raise a fresh Hæmorrhage, the Swelling and Inflammation abate, and the foreign Bodies are easily extracted. But in all these Incisions, especially in the Limbs, the *Tournequet* should be applied to the Part.

Of more extraneous Bodies.

XXI. But as two Balls are often concealed in the same Wound, after the Removal of one, the Surgeon should diligently search for another, or for any other extraneous Body that may be forced in with it: For unless every thing foreign be first removed, it is in vain to expect the Cure of the Wound.

Other necessary Observations.

XXII. When you attempt the Extraction of a Ball or other extraneous Body, you should endeavour to place your Patient in the same Situation he was in at the Time of receiving the Wound: For by frequent Changes of the Situation, the Ball will easily bury itself, and get out of your Reach. If the Wound cannot easily be enlarged, nor the Balls extracted without great Pain and Danger, they must be left in the Wound, either till the Pain is abated, or the Passage rendered so easy by Suppuration, that they work themselves out. On the other hand, extraneous Bodies are instantly to be removed, where there is Danger of bringing on Convulsions, Pain, or Inflammation, by being left behind.

Balls lodged in the Thorax or Abdomen.

XXIII. If a Ball has passed into any Cavities of the Body, where the Extraction of it cannot be attempted with Safety, it is best to leave it where it has lodged, and heal the Wound. For there have been Variety of Instances, where Persons have carried Balls in them for many Years, nay, for the best Part of their Lives, without suffering any Inconvenience. It sometimes happens that they work themselves out into some other Part of the Body, from whence they may be extracted with Safety.

Balls lodged in the Viscera.

XXIV. But if a Ball be lodged in a Viscus, as the Brain, Lungs, Liver, Spleen, &c. that you can neither see, nor reach it, the Case is generally mortal.

If

If you can see it, it is only on the Surface. Therefore by enlarging the Wound of the Viscus, as far as is convenient, you will make room for the Pliers or Forceps to extract the Ball, which must be introduced with the utmost Caution.

XXV. When the Wound has been cleared of the extraneous Bodies, and the Hæmorrhage stopped, you must endeavour to remove the Eschar by Suppuration. The Treatment of the Wound, when cleansed. In the next place you attend to the bad Symptoms arising from it, such as violent Swellings and Inflammations, Fevers, Gangrene, and Mortification, excessive Weakness, Nausea, &c. some of which are to be prevented, and others remedied. To prevent therefore violent Swellings and Inflammations, which are here always dangerous, and often bring on a Gangrene and Mortification; besides proper Incisions, you should apply externally *Spirit. Vini simp.* if the Wound be slight: if not very slight, add to each it of the *Spirit. 3^{rs} of Sal. Ammoniac.* or *Aq. Calc.* with about a fourth Part of *Spirit. Vini Camphor.* with a little of the *Sal Ammoniac.* Thick Compresses dipped in this Mixture should be applied warm to the affected Part several times in the Day. If in Parts that are contused and greatly inflamed, the Blood should be concreted under the common Membranes of the Muscles; these Membranes must be scarified without reserve, not only in their longitudinal, but in every Direction: for otherwise the stagnated Blood cannot be removed, and of Consequence a Gangrene and Mortification would arise, or at least very dangerous Abscesses. And sometimes you must cut even the Tendons, especially in Wounds of the *Tarsus* and *Metatarsus*, where you have acute Pains, that may be attended with Danger.

XXVI. Where there is a very great Corruption of the Parts, after repeated Scarifications apply the digestive Ointment; to which you may add a little Myrrh or Aloe, *Unguentum fuscum*, or red Precipitate. Let the Wound be dressed with these, till the injured Parts are separated, and the rest well cleansed. Then let it be treated as a simple Wound. A great Corruption of the Parts.

XXVII. In deep Wounds where the Ball has gone quite through (especially if they happen in the Buttocks or Thigh, and the Passage of the Ball is oblique) a particular Method is to be used. After scarifying the Lips of the Wound, a Skein of Thread is to be drawn through the Eye of a long blunt Needle, (*Plate V, Fig. 1.*) and, being well saturated with the Ointment we have prescribed, passed through the Wound in the Manner of a Seton. It should be kept there, till you discover by the Redness of the Wound that the corrupted Parts are cast off, and the whole is in a readiness to heal. LE DRAN absolutely rejects the Setons; but I have often seen the good Effects of them. You should take particular Care that the Thread be very soft. Of Setons in Nervous Wounds.

XXVIII. Gun-shot Wounds, though in the strongest Constitutions, generally produce the worst of Symptoms; as excessive Weakness, Faintings, Tremors, Palpitations, Convulsions, Hiccoughs, &c. after which succeed instantly dangerous Fevers, nauseous Vomitings, and the like. All which require the particular Attention of the Surgeon. Symptoms of these Wounds.

XXIX. Amongst the many terrible Symptoms attending these Wounds, the first is an excessive Languor, which is soon followed by fainting Fits, partly Weakness. occasioned by the Hurry of their Spirits, and partly by the Effusion of Blood. If from the first Cause, Draughts or Mixtures composed of Cordial Waters, Cardiac Powders, and a strengthening Diet, are to be prescribed. If from the latter, to recruit their Strength and replenish their Veins, let them indulge in all

all things nourishing; as the *Decoct. Hord. vel Aven. Corn. Citrat.* for their common Drink, with a small Quantity of Wine or generous Beer, Milk, Emulsions, good Broths, and comfortable Juleps.

2. Nausea.

XXX. Some are seized with a violent Nausea, or Abhorrence of Food. This arises partly from the Terror they are under, and partly from too great a Repletion before the Accident. It is too customary with military Men to eat and drink freely, as if by this means they acquired fresh Strength. Hence, on a sudden Fright, the Motion of the Stomach being inverted, and the Digestion disturbed, a Nausea is the Consequence. In such a Disorder, as Experience teaches, that those who vomit spontaneously receive great Benefit, we should here apply a gentle Emetic, and then settle the Patient's Stomach with a Cordial Draught. By this Method his Appetite and his Strength generally return; and the Cure of the Wound is happily promoted. If the Patient is averse to an Emetic, you should give some proper Purgative in its stead.

Vulnerary Fevers.

XXXI. Intermitting Fevers in vulnerary Cases are to be treated like others of the same kind: but be sure to give an Emetic at the beginning. But if an acute Fever come on, attended with frequent Horrors, as they indicate strongly internal Inflammations, we must bleed the Patient in Proportion to his Strength and Fullness of Blood: then order him a gentle Dose of *Ipecac.*; some thin Liquor for his ordinary Drink; cooling Powders and Draughts, with Camphire, and a moderate Diet. He should take largely of the *Peruvian Bark*. But he must particularly abstain from Pork, from all salt Meats and of hard Digestion.

Pains and Convulsions.

XXXII. Pains and Spasms are generally produced, either (1.) By extraneous Bodies remaining in the Wound, which prick and vellicate the nervous Parts: or (2.) By large Tumors and Inflammations, which are always visible: or (3.) By the violent Collision and Laceration of the nervous and tendinous Parts. If these Symptoms arise from foreign Bodies, we must endeavour to remove them as soon as possible. If from excessive Tumor and Inflammation, these must be discussed by the means above-mentioned. But if there be danger of a Gangrene and Mortification, besides the deep Incisions, frequently repeated for the discharge of the putrescent Blood, and besides the Medicines we before recommended, large Quantities of *Peruvian Bark* must be given inwardly; and Lint, well saturated with Spirit of Turpentine, be applied to the Wound. They are both excellent Remedies in this Case.

Amputation where necessary.

XXXIII. But if all these Remedies frustrate our Hopes, there remains one only, and, as CELSUS observes, a deplorable Refuge, the Amputation or the corrupted Part. But, whenever violent Pains, Spasms, and Convulsions are occasioned by the Collision or Laceration of the nervous or tendinous Parts; it is adviseable at the first, or very early at least, to cut the Tendons, Aponeuroses, and common Membranes of the Muscles that are injured, just above the Wound. For if these Symptoms are not speedily removed, Death must be the Consequence. But if this avail nothing, it is better at once to amputate the Limb, than by unreasonable Delays destroy the Patient: for these partial Convulsions soon become universal.

Fresh Hæmorrhages.

XXXIV. About the seventh or eighth Day, sooner or later, from the inflicting of the Wound, fresh Hæmorrhages usually succeed^a. To suppress which, we

^a When the *Eschar* separates.

must

must proceed, as above, and earnestly advise the Patient to indulge Rest, and stir as little as possible. Otherwise, these Hæmorrhages are too apt to return about the fourteenth Day.

XXXV. About the same time you have generally a Looseness, which some think not only unsalutary, but very prejudicial: but in general it should be esteemed salutary and critical; especially in corpulent Patients, and of a bad Habit of Body: for thereby many bad Symptoms are abated; and a Wound, which before was unpromising, takes a new Turn, and a different Aspect. Therefore we should by no means check it with Astringents; but gently assist Nature with warm, diluting, lubricating, and mucilaginous Draughts; with *Ol. Amygdal. dulc.* with lenient Clysters, till it stops spontaneously. But if it continue too long, we must then have recourse to the astringent Powders; particularly *Pulv. Rhabarb. cum Cort. Cascarill.* These should be repeated often in the Day; and at Night give a Dose of *Diascordium*, or *Theriaca ex aquâ Menthæ vel Cinnam. Cydoniat.* Nor must a proper Regimen and Diet be omitted.

In Case of a Looseness.

XXXVI. If the Wound prove obstinate from any Venereal Taint, which will easily appear from other Symptoms of that Disorder, antivenereal Remedies must be applied. If there remain Fistulas, which are commonly occasioned by Fragments of the Bones, or extraneous Bodies being left behind; or if there is a Caries; these Symptoms are for the most Part easily removed by removing the Causes. But if the Wound is inflicted on the Breast, and part of its Substance destroyed by it, the Case is too generally fatal. A Caries often requires length of Time and Patience: yet Nature, if assisted with proper Medicines, frequently conquers it. It is no uncommon thing to see an Atrophy in the Limbs after violent Wounds, where the Parts are so lacerated, and the Circulation of the Blood so impeded, that they want their due Nutriment. In this Case, all strengthening and emollient Medicines, all Ointments and Fomentations are extremely efficacious, and particularly the use of natural Baths.

Venereal Symptoms, Fistulas, Caries and Atrophy.

XXXVII. In Gun-shot Wounds several Grains of Gunpowder frequently penetrate the Skin of the Face, and occasion a Deformity, if not removed: this may be done with a Pen, or an Instrument like an Ear-picker, *See Plate VI, Fig. 14.* But if they have penetrated too deep to be picked out in this manner, the Skin must be laid open with a fine small Lancet, that you may remove them with the Instruments we have described. Great Care must be taken not to break the Grains in picking them out; for they will occasion very foul Spots. The same Method is to be observed with regard to small Shot. If you would be further informed of Gun-shot Wounds, and the Writers on that Subject, turn to the XIIth Number of the Introduction to this Work; and consult particularly the excellent LE DRAN.

To extract Gunpowder and small Shot.

CHAP. IV.

Of WOUNDS of the ABDOMEN.

I. WE have hitherto considered what was in general to be attended to with regard to any sort of Wound, whether made by Cutting, Stabbing, or by the Explosion of a Gun. We come in the next Place to explain fully the Nature

The Intent of this Chapter.

Nature of each particular Wound, and shall speak distinctly of Wounds: 1. Of the *Abdomen*. 2. Of the *Thorax*. 3. Of the *Neck*. 4. Of the *Head*.

Differences
of Wounds
in the Abdo-
men.

II. *Wounds of the Abdomen* only affect the common Integuments and Muscles, or penetrate into the Cavity of the Abdomen. Those that penetrate into the Cavity of the Abdomen, are inflicted lengthways, obliquely, or transversely, and in these the Bowels either burst out through the Wound, or preserve their natural Situation. These differences of Wounds in the Abdomen ought to be diligently attended to by the Surgeon, since they require a different kind of Treatment.

How those
Wounds are
to be disco-
vered.

III. These Wounds may be conveniently enough examined; 1. By the Eye; 2. By passing the Finger or the Probe; or lastly, 3. By injecting warm Water into the Wound. If the Water meets with no Obstruction, you are sure that the Wound penetrates; but if it returns back upon you, and the Probe meets with Resistance, the Abdomen is not entirely opened.

Wounds that
do not pene-
trate.

IV. Wounds which do not penetrate the Cavity of the Abdomen, are attended with much the least degree of Danger. They are generally divided into two sorts. 1. Either the Wound is only upon the common Integuments; or, 2. The Muscles also of the Abdomen are divided, as far as the Peritonæum. The first of these is too slight to require a distinct Method of Cure from other Wounds: but Wounds of the last Class are extremely dangerous; because the Intestines, in this Case, easily fall through the Wound. If the Wound is large, great Skill is required in the Surgeon, especially if it is made in a transverse or oblique Direction. But if it is lengthways, by cleansing the Wound, applying the vulnerary Balsam, and a healing Plaster, with the large uniting Bandage, as at *Plate V, Fig. 8.* all will go well; if carefully dressed according to these Directions, and the Patient indulge Rest, and observe a proper Regimen, the Cure generally is effected without a Suture. But should the Wound be transverse or oblique, in this Case to prevent a Rupture the Suture is necessary to keep the gaping Lips of the Wound together, as we shewed partly above at *Chap. I, N XLIV.* The manner of performing this we shall describe below in a Chapter upon *Gastroraphy*. Having taken these Precautions for preserving the Peritonæum and Intestines in their natural Situation, the Surgeon ought to dress up the Wound with vulnerary Balsams, and an adhesive Plaster: to give the Patient Rest, to order him a soft Clyster if his Bowels are not naturally open, and to enjoin Abstinence.

How wounds
are to be
searched
when they
penetrate.

V. When the Surgeon discovers that the Wound penetrates into the Abdomen, he ought, before all things, to examine well, whether it be direct or oblique, and whether any of the Contents of the Abdomen partake of the Injury. He will easily determine in the Negative, if it shall appear; 1. That there is no great Degree of Weakness, Hæmorrhage, Pain, Fever, &c. 2. If upon laying the Patient upon the wounded Side, there is no discharge of Chyle, Gall, Excrement, or Urine. 3. If Milk, being injected warm, returns without any Alteration of its Colour. 4. If the inflicting Instrument is not very sharp; and lastly, 5. If there is no vomiting nor discharge of Blood by the Mouth, Stool, or Urine, nor Swelling and Hardness of the Belly. But as the Operation of *Gastroraphy* is sometimes extremely necessary, and always attended with Danger, if it is not performed with the greatest Accuracy, I have thought it my Duty to describe it carefully in the following Chapter.

C H A P. V.

Of GASTRORAPHY.

I. **G**ASTRORAPHY is the Suture of Wounds of the Abdomen. This Operation is unnecessary; 1. When the Wound is only in the muscular Part; or, 2. Is not very large, especially if it is made lengthways. For if the Wound should penetrate into the Cavity of the Abdomen, and even let out Part of the *Omentum* or *Intestines*; yet, where it is very small, as Wounds generally are which are made by Puncture, or happen lengthways, upon returning the Parts which are pushed out, stopping the Wound up with a soft Tent, and securing all with a proper Bandage, it may be healed without the help of the Needle. Besides, in fat Persons this Operation is very difficult, and it would be an act of great Cruelty in a Surgeon to perform the Operation upon a Man, when he might be cured after an easier Method.

When Gastroraphy is unnecessary.

II. But there are two Cases where Gastroraphy is absolutely necessary. The first is, where the Wound is so large, that there is no Possibility of retaining the Intestines by any other Method. For as the Intestines are continually pushed forwards in the act of Inspiration, by the Action of the Diaphragm and the Abdomen, the falling down of the Intestines in this Case is unavoidable, especially in large Wounds from a Cut, See *Plate III, Fig. 1, Lett. O*, and therefore the Operation necessary. But there is another Case also where this Operation is required; to wit, in large transverse Wounds of the Abdomen where the Muscles are divided, but the Peritonæum is not concerned. See *above Chap. IV, N. IV*.

When it is necessary.

III. In Wounds of the Abdomen the chief Enquiry is, *Whether the Omentum or Intestines are let out?* If none of these have burst through the Wound, the Lips of the Wound should be kept as close together as possible with the Hands, and the Patient kept with his Head laying downwards till the Wound is sufficiently secured from letting out the Contents of the Abdomen. But when the Intestines are already fallen out, they must be returned with the greatest Expedition, lest they should receive any Injuries from the external Air. But we should first examine whether they have received any Wound or not, and whether they preserve their natural Warmth and Colour. For where they are cold, livid, and dry, or wounded, they are not to be returned suddenly, but treated in the manner we shall describe below.

Of the falling down of the Intestines.

IV. You will easily perceive that there is some Hurt in the Intestines, though the Wound does not immediately appear, if there is a more than ordinary Flaccidity in them. When this Symptom appears, it will be proper to pull the rest of the Intestines gently forward, till you come at the Injury, and when you have found it, you may treat it as we shall shew you in *Chap. VI*.

How to discover a Wound in the Intestines.

V. When you find the Intestines uninjured, they must be instantly returned, to prevent them from receiving any Injuries from the external Air. In order to do this with the greater Ease, put the Patient in the supine Posture which we described at *N. III*, only placing him upon the Side opposite to the Wound. The Patient being thus situated, an Assistant should endeavour to return the Intestine with his two Fore-fingers, taking Care not to take off one Finger till the other is upon the Gut. The Patient should be encouraged all the while to

How to return the Intestines.

hold his Breath, and the Assistant should bring the Wound together with his Fingers, or with Hooks, *Plate VIII, Fig. 2, 3.*

How the Intestines are to be treated when they are dry and cold.

VI. Hitherto we have described the Method of returning the Intestine whilst it was warm and unwounded: it remains that we teach the Method of treating the Intestines when they are cold and dry. In this Case it is best to foment them with warm Water or Milk before you return them; or, where you can have that Opportunity, get the Cawl of a Calf, a Lamb, a Hog, or of any other Animal just killed, wrap this round the Intestines whilst it is reeking, and keep them in it till they recover their natural Heat and Colour. But if they do not return, all medicinal Efforts are vain: the Patient must die. If this Dryness or Coldness of the Parts is very small, and the Intestines are not at all corrupted, it is best to return them instantly into the Body, where the Heat and Moisture of the neighbouring Parts being natural to them, will give them a more speedy and natural Refreshment, than can be reconciled to them by any artificial Means.

How the Intestines are to be returned through a small Orifice.

VII. When the Intestines are forced through a small Wound, and are afterwards so distended with *Flatus*, that they cannot conveniently be returned, it will be proper to pull the Intestine gently forward, that more of it may come out, that so the *Flatus* being divided may take up less Room in any one Part. An Assistant should now gently dilate the Wound with his Hands, or two Hooks, *Plate VIII, Fig. 2, or 3.* fixed in the internal Membrane, that the Surgeon may return the Intestines, which when he has done in such a Manner that each Part may recover its natural Situation, (*See N. V.*) the Wound should be secured first with his Hand, that the Bowels may not burst out again. Then it should be filled up with some Dossils, or, where there is a considerable Quantity of Blood spilt in the Abdomen, with a soft ^aTent, *Plate II, Lett. L, M, N, O*; dressing it up with proper Plasters, Compresses, and Bandage. The Patient is to be kept as still as possible, lying as much as he can upon the Wound. After this the Wound is to be dressed daily, or, where there is a large Discharge of Matter, twice every Day, with some vulnerary Balsam; and if we proceed in this Manner, where the Wound is not very large, the Patient may be excused from the Pain, and the Surgeon from the Trouble of making the Suture.

How small Wounds are to be enlarged.

VIII. But if the Wound is so narrow, that we can neither bring the Gut forward nor reduce it, it must be enlarged with a Knife, or the grooved Probe, called *Conductor*, beginning the Division at that end of the Wound which is most convenient, taking great Care not to wound the *Linea Alba*, the Vessels which lie under the *Musculi Recti*, or, lastly, the Intestines themselves. Some Surgeons, in the Room of the Incision Knife and Conductor, use in this Place the *Syringotomus*, whose Point is guarded with a Button, and which is used in *Fistulâ Ani*, (*See Plate XXXV, Fig. 4, 5.*) Some are fond of other Instruments; but I

^a See CÆLUS, Book VII, Chap. 16.

Some of the modern Writers in Surgery, particularly GARENGEOT, forbid the use of Tents in all Wounds of the Abdomen. In the Year 1734, a young Surgeon in my Neighbourhood observed this Rule, when he was called to a Man that had received a Wound between the Navel and the Penis, the Wound penetrated the Abdomen; for the first two Days the Symptoms were favourable, but upon the fourth Day he died. Upon opening his Body, we found a large Collection of Matter in the Abdomen, with the Omentum putrified. If a Tent had been used, the Matter would have been discharged, and the Patient's Life saved.

think the best Instrument by far in this Case, is the Knife which I invented for this Purpose, and have given you a Description of at *Plate V, Fig. 3.* or one of those at 4 and 5. The Knife is never to be used, till the Assistant has applied a warm Omentum to the Intestines that are already extra-abdominal, to prevent them from Injuries. But where the Intestines are so inflated, that it is impossible to get the Probe End of the Knife, or a Conductor into the Abdomen, then hold back the Intestines with the Left-hand, and with the Right make an Incision through the common Integuments and Muscles as far as the Peritonæum; sponging up the Blood as you go on. The Wound will most likely be sufficiently relaxed by this to make way for the Readmission of the Intestines, at least it will admit the End of the Knife to divide the Peritonæum, so that you may enlarge your Wound at Pleasure, and return the Gut as directed at *N. V.*

IX. If any hardened Excrement lies in the Intestine, and impedes its Reduction, emollient Fomentations and Cataplasms should be applied, and more of the Intestine should be pulled out; for by this Means the Fæces may be divided by the Hands, and the Intestine returned conveniently. PARÆUS and other Surgeons have recommended a particular Method of returning the inflated Intestine without enlarging the Wound, by making small Punctures in the Intestine with a Needle, through which Punctures the wind will certainly escape, and the Sides of the Gut subside: and this, they affirm, is attended with no Danger. Nevertheless, for my own Part, I prefer the Enlargement of the Wound to making these Punctures, and to the pulling out of a greater Share of the Intestine to divide the Contents; especially since many Surgeons affirm, that these Punctures are neither safe, nor useful for the End to which they are directed. BLANCARD has given us an Instance where they failed, in his *Collect. Medico-Physic. Part. ult. Obs. I.*

How to return them without enlarging the Wound.

X. When the Intestines are returned, if the Wound is not large, and is made lengthways, there will be no Occasion to perform the Operation; which is always of dangerous Consequence, and therefore should never be attempted but in Cases of the greatest Emergency. If the Suture is not absolutely necessary, pass a soft Tent into the lower Part of the Wound, and apply sticking Plasters to the Sides of it, covering them with long thick Bolsters, securing these Dressings with a uniting Bandage, such a one as you will find described in *Plate V, at Fig. 8.* When the Patient is thus dressed, draw some Blood from the Arm, to prevent an Increase of the Inflammation; advise him to keep very still, and observe a strict Regimen with regard to his Diet. The Dressings are not to be removed, unless some violent Symptom requires it, before the third Day; and afterwards only once a Day, or rather every other Day, lest the Union of the Wound should be retarded by frequent Handling. On the other hand, if the Wound is large, and made in an oblique or transverse Manner, as described *Plate III, Lett. 1, O,* so that the Intestines cannot be kept within the Abdomen by this Method, the Operation must be performed without Delay.

When and how to heal the Wound without the Operation.

XI. The Operation may be performed in the following Manner: Pass a strong double or quadruple Thread, well waxed, through two crooked Needles; (See *Plate VI, Fig. 5 and 6.* or another, which was communicated to me by a Friend, at *Fig. 7.*) with these stitch up both Ends of the Wounds, beginning at one End with the upper Lip of the Wound, passing the Needle through the

How to perform the Operation with two Needles.

Patritonæum, Muscles of the Abdomen, and the common Integuments, from within outwards, leaving about a Thumb's Breadth between the Stiches and the Mouth of the Wound, that they may take the stronger Hold, observing the same Method in passing the other Needle through the lower Lip. Whilst you are passing the Needle with one Hand, it will be proper to support the Lips of the Wound with the other, to prevent the Intestines from being wounded. It will frequently be very difficult to hold the Needle steady with the naked Hand; to remedy this Inconvenience, the modern Surgeons have invented an Instrument to receive the Needle, and form a Handle for it, which the *French* call *Portaiguille*. See *Plate VI, Fig. 2, 3, and 4.*

With a single Needle.

XII. If you are not provided with two Needles, the Operation may be performed with one: For, after you have stiched up one End of the Wound in the Manner we have described, you may take off the Needle, and perform the same Operation on the other End, and proceed afterwards as usual. Likewise, instead of Thread, a small kind of Lace^a, composed of six Threads, may be judiciously substituted; as the Threads themselves are liable to break, or they may sometimes cut through the Lips of the Wound, and destroy the Suture.

Large Wounds require many Stiches.

XIII. In a Wound of a middling Size, that is to say, of about two Fingers Breadth, one Stich in the Middle will be sufficient: But in larger Wounds, the Stiches must be repeated in Proportion to their Size, leaving a Thumb's Breadth between each of the Sutures, the Extremities of the Thread hanging down on each Side, as we have shewn you in *Plate III, Fig. 17.* and in *Plate IV, Fig. 15.* Having made the proper Number of Sutures, an Assistant should keep the Lips of the Wound together, whilst the Surgeon fastens the Ends of the Threads in Knots.

How the Knots are to be made.

XIV. Both Ends of the Thread are to be taken up, and to be tied first in a single, then in a slip Knot, as we taught above in *Chap. I. N. XLIV and XLV.* passing a small Bolster between the two Knots, (*Plate II, Fig. 22.*) to prevent the Skin from being hurt. Where there are more Sutures than one, you must begin at the upper Part of the Wound, tying them down in Order, that, before the last is tied, a soft Tent, of the Size of a Finger, with a Thread fastened to the End of it, may be introduced into the lower Part of the Wound. This Tent will keep a Passage open for the Evacuation of grumous Blood or Matter, which may be collected in the Cavity of the Abdomen. Some of the modern Surgeons, particularly GARENGEOT, absolutely forbid the Use of Tents in these Wounds; and assert, that the Spaces left between the Sutures will afford a sufficient Passage for the Discharge of Matter from the Abdomen; but I believe this frequently proves to be very false. See the Observation which we have added by way of Note to *N. VII. of this Chapter.* This one Fact has more Weight with me than all the ingenious Reasons that can be brought to support the contrary Opinion.

How the Wound is to be dressed after being stiched.

XV. The Stiches being all tied, and the Tent passed into the lower Part of the Wound, the Wound should be well anointed with some vulnerary Balsam, and covered with Pledgits of Lint, a sticking Plaster, and Bolsters, securing all with the scapulary Bandage. See *Plate III, Fig. 1, Lett. B, C.* At every Dressing the Surgeon should be very cautious in removing the Bandage, Bolsters,

^a See PALFINUS's Surgery, *Cap. de Gastroraphia.*

Æc. the Tent should be taken out, and the Patient turned upon the wounded Side, that if any Matter is collected in the Cavity, it may be easily discharged. Where there is a large Collection of Sordes, it will be proper to prepare a *vulnery Injection, ex Decocto Herbæ Agrimonæ, Saniculæ vel Hyperici, admixto Rosarum Melle*. This Medicine should be thrown by a Syringe moderately warm into the Cavity of the Abdomen twice or thrice at every Dressing, turning the Body afterwards upon the Wound, that the Blood and Matter, which are mixed with the Injection, may be evacuated with it. Having proceeded in this Manner, pass a new Tent into the Wound, moistened with some digestive Ointment, and dress up as before. This Method of cleansing the Parts, and dressing the Wounds, is to be repeated daily, till there remain no Signs of any Foulness within. After this the Tent may be removed, and the Wound healed after the usual Methods. To forward this Intention, Rest and proper Regulations in Diet are very serviceable, advising the Patient to lye as much as possible upon the Wound, placing a soft Pillow immediately under it; for, by this Posture, the Matter meets with a more ready Discharge; and the Lips of the Wound are induced to heal, from constant Pressure.

XVI. Those Wounds also require the Suture, which are extended as far as the *Peritonæum*, though they do not break through it into the Cavity of the Abdomen: For in this Case the *Peritonæum* is in constant Danger of being too much distended, from the vehement Motions of all the Parts of the Abdomen, in Breathing, Rising, Walking, at the Expulsion of the Excrements, &c. Upon the Relaxation of this Membrane the Intestines would soon make their Way between the Muscles, and bring on very bad Symptoms and dangerous *Herniæ*. These Mischiefs cannot better be prevented than by performing the Operation described above at N. XI, XII, XIII. but we must observe in this Case, that as the *Peritonæum* is not wounded here, the Needle must pass only through the Muscles, and common Integuments.

Another
Case which
requires this
Operation.

XVII. The Surgeons for many Years performed this Operation of stitching up Wounds of the Abdomen with the interrupted Suture, and preferred that to all other Methods. But several amongst the Moderns, as we hinted above, prefer the quilled Suture (by the *French* called *Enchevillée*) in all large deep Wounds, but more particularly in Wounds of the Abdomen. For as the Muscles of the Abdomen, above all other Parts, are subject to violent Motions in Breathing, Sneezing, Coughing, and from many other Causes, by which Motions the Threads have sometimes burst through the Lips of the Wound, and great Mischiefs have ensued; some modern Surgeons therefore, and particularly DIONIS, have introduced the quilled Suture again in this Case, which had been before rejected. But to prevent the Lips of the Wound from suffering by the Pressure of the Pieces of Wood, which were formerly used in this Suture, he substitutes Rolls of Silk spread with some Plaster in their Room, as we shewed above, B. I, Chap. I, N. XLVI. and at Plate IV, Fig. 16. by which Method the Cure will be effected more successfully, and with more Ease to the Patient. In large transverse Wounds of the Abdomen, which do not pass through the *Peritonæum*, PALFYNUS advises the Use of this Suture, which is to be performed according to the Method I have described above in the first Chapter, N. XLVI.

The quilled
Suture used
here.

GAREN-
GEOT's Me-
thod.

XVIII. GARENGEOT prefers this Suture to all others, even in Wounds that penetrate into the Cavity of the Abdomen, and recommends the following Manner of performing it. Instead of a double Thread, he twists six or eight strong Threads together, like a Lace, and waxes them well, passing them through the Eye of a large crooked Needle, such an one as is described in Plate VI, at Fig. 5 or 6. The Surgeon takes hold of the Needle at the blunt End with his Right-hand, and passes the Thumb of his Left-hand into the Wound, raising the upper Lip with it, whilst he fixes the Fingers of the same Hand upon the external Part of the Lip: He then introduces the Point of the Needle into the Abdomen, and raising it up about two Fingers Breadth from the Opening of the Wound, pierces through the *Peritonæum*, Muscles, and common Integuments. Then taking off the Needle, he fixes it to the other End of the Thread, and lifts up the lower Lip of the Wound, by introducing his fore and middle Fingers under it, and clapping his Thumb upon the external Part of it; and pierces it with the Needle in the same Manner he did the upper Lip. If the Wound is four Fingers long, it will be necessary to make two Stiches, at equal Distances from each other, and from the Extremities of the Wound; if it is less^a, one will be sufficient; if it is larger, more than two are required. The Threads are to be unravelled and divided into three equal Parts at each End; through two of these Parts the Rolls of Plaster are to be passed on each Side of the Wound, and to be fastened on with bow Knots. Then the *Balsamum Arcaei* must be laid on with some Lint, and that fastened again, though not too tight, with the remaining Part of the Threads, in the same kind of Knots. The Abdomen is to be well bathed *cum Oleo Rosarum calido pauco Spiritu Vini admisto*. This Embrocation is to be used chiefly upon the Parts near the Wound, and about the Region of the Navel; a large Bolster wet with the same Medicine is to be applied to these Parts, and over this another dipt in *Oxyrato calido*. These Applications are to be covered with Flannel well soaked in an emollient Decoction: The whole is to be secured with the Scapulary Bandage and Napkin; the Napkin is suspended by the Scapulary, which in this Case ought to come somewhat lower than usual. See Plate III, Fig. 1, C.

How to heal
the Wound.

XIX. When the Lips of the Wound about the Sutures appear to be united, which you will perceive by the loosening of the Threads, you may cut the Knots, one after another, either at the same Time, or on different Days, as you shall see Occasion: And when you have gently drawn them away, as we taught you at N. XLIX, the rest of the Cure will easily be performed by the Assistance of some vulnerary Balsam and sticking Plasters. You must take great Care not to draw the Stiches too soon, for by that Means the Lips of the Wound would burst open again, and bring on grievous Mischiefs. Besides, a Bandage must be continued on the Abdomen for a considerable Time.

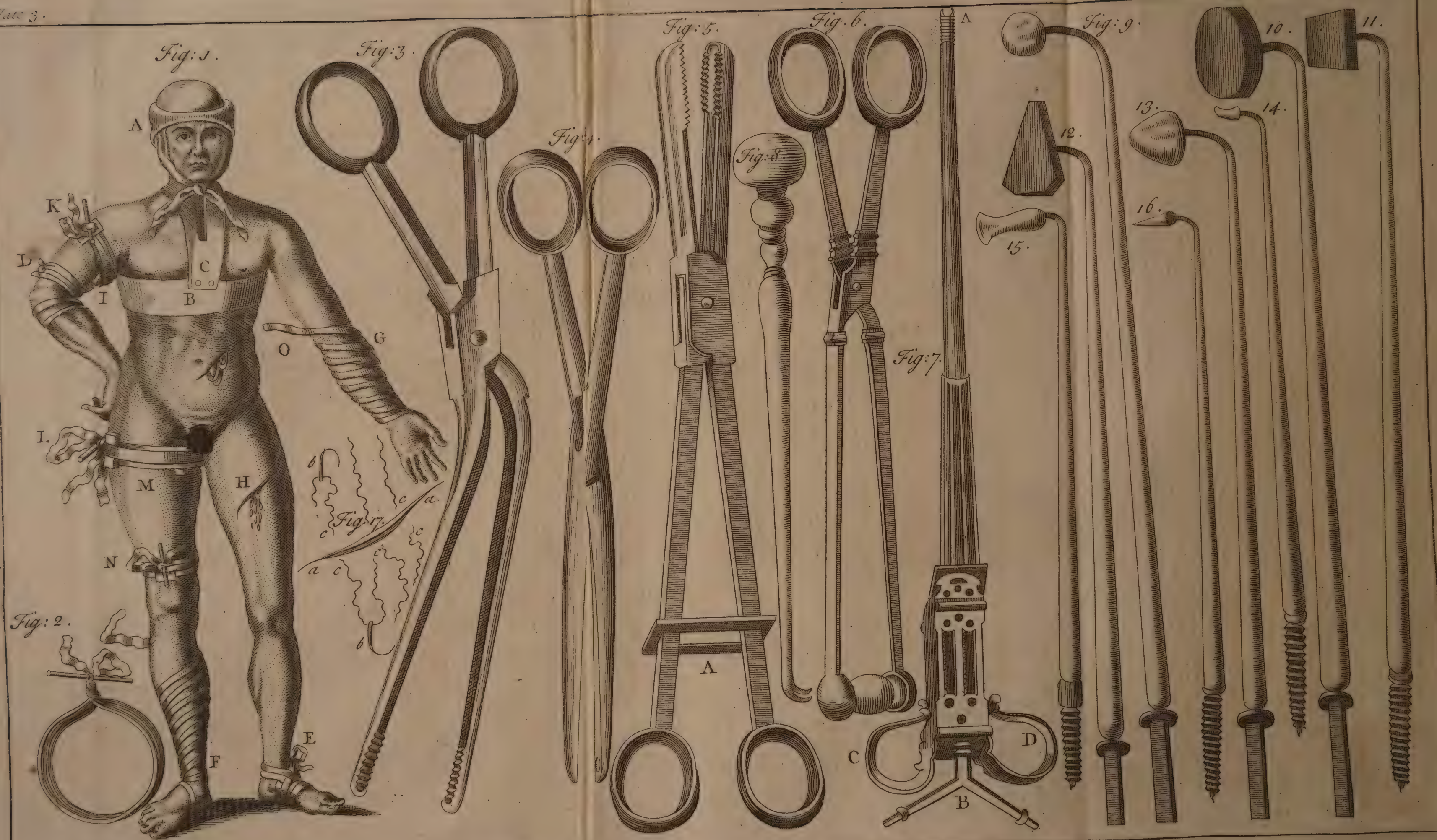
EXPLANATION of the THIRD PLATE.

Fig. 1, Letter A, Describes how the *Grand Capital Bandage* is to be applied after the Operation of the Trepan, or after Wounds of the Head.

^a GARENGEOT, *Operat.* Tom. I. p. 220. Edit. 2d. But I wish he had been more accurate in describing how the quilled Suture could be performed by one Puncture; for two at least are required to keep the Quills firm.

B, The





B, The *Belt* or Napkin, which is to surround the Body in Wounds of the Thorax or Abdomen, to bind the Applications to the Part affected.

C, The *Scapulary*, to support the Belt.

D, The Method of making the Ligature after Bleeding in the Arm.

E, The Manner of tying up the Foot after Bleeding, which, from the Similitude it has with a *Stirrup*, is called by that Name.

F, Shews the spiral Manner in which the Bandage ought to ascend, when it is applied to the Leg or Arm; which is sometimes called *the expelling Bandage*.

G, A serpentine Bandage, where the Convolutions are not so frequent.

H, A large Wound in the Thigh, which requires the true or bloody Suture.

K, The Part where the *Tournequet* is to be applied to the Arm, and the Manner of applying it.

L, The Manner of applying it to the upper Part of the Thigh; the Bandage which is rolled up, and applied as a Bolster lyes upon the crural Artery at M.

N, Shews how the *Tournequet* is to be applied to the lower Part of the Thigh, in which Case the rolled Bandage is to be applied to the back Part of the Thigh.

O, A large Wound of the Abdomen, with the Intestines falling out.

Fig. 2. The common *Tournequet*, before it is applied.

Fig. 3. Crooked Forceps furnished with Teeth at the End, called the *Crane's Beak*.

Fig. 4. A pair of strait Forceps.

Fig. 5. The *Duck's Bill* Forceps, furnishing with a moveable Ring at the lower End.

Fig. 6. The *Goose Bill* Forceps.

Fig. 7. The Instrument invented by BARTHOLOMÆUS MAGGIUS to extract Bullets that are fixed in a bony Part.

Fig. 8. A Hook to extract Bullets.

Fig. 9, 10, 11, 12, 13, 14, 15, 16. Different Sorts of Cauteries.

Fig. 17. Shews in some Measure the Manner of performing the Operation called *Gastroraphy*, or the Suture of the Abdomen. The Letters *a a* describe the Wound; *b b*, two crooked Needles with the Threads hanging to them; *c c c c*, two Threads drawn through the Lips of the Wound, and cleared from their Needles.

CHAP. VI.

Of WOUNDS of the INTESTINES, and the Manner of stitching them up.

I. **W**HEN a large Wound is made in the Cavity of the Abdomen, that not only lets out the Intestines, but also divides some Part of them, (See Chap. V, N. IV.) the Surgeon ought always to stitch up the wounded Parts of the Intestines, before he returns them. By this Means we may not only expect the Wound to heal more readily, but the Discharge of Chyle and Fæces into the Cavity of the Abdomen, which would bring on great Mischief, is prevented. And although Wounds of the Intestines, especially of the small Guts, admit of little or no Hopes of a Cure; yet as the great Guts, as CÆLIUS observes,

When the Suture of the Intestines is to be performed.

observes, *Lib. VII, Chap. 16.* sometimes admit of the Suture to advantage, it is better to use a doubtful Remedy than none: Therefore the Surgeon should never neglect examining whether the Intestines are injured, that he may use all probable Means of healing them. See above *Chap. V, N. IV, V.*

When the Suture is not to be attempted.

II. Small Wounds of the Intestines, that do not exceed in Size the Diameter of a Goose Quill, should by no Means be stiched, but are best left to Nature. If they are left to themselves, they will frequently unite much sooner than if they are irritated by the Suture: For Stiching usually brings on great Pain, Inflammation, and other bad Symptoms. Therefore it will be much better to return them instantly, (*See Chap. V, N. V.*) and to bleed the Patient to prevent Inflammation, advising him to Rest and Abstinence. For it is better by Industry and Care to cherish even small and glimmering Hopes, than through Fear and Negligence to give the Patient over.

How the Opening is to be performed.

III. But large Wounds of the Intestines, though they seldom admit of Cure, are to be stiched up with *the Glover's Suture*, before the Intestine is returned: To perform this you should be provided with a fine Needle threaded with Silk. An Assistant should take hold of one Part of the Gut, with a fine Piece of Linen well aired before the Fire; whilst the Surgeon should hold the other Part in his Left-hand, and sew up the whole Wound after the Glover's Manner, leaving very small Spaces between each Stich; to wit, little more than a Mathematical Line. The last Stich should be fastened with a Knot, but the other End should hang about a Foot out of the Abdomen, by which the Silk may be drawn out when the Intestine is healed, *See Plate IV, Fig. 20.* Some in this Case prefer the *interrupted Suture*, because it is performed with fewer Punctures, and therefore is not liable to bring on so great Inflammation; though the Threads, which are very small, should be left behind. GARENGEOT proposes another Method of performing *the Glover's Suture*, in *Operat. Chirurg. Artic. de Gastroraphia*. But to say Truth, Experience shews us, that very few are saved, whatever Suture is made use of.

What is to be done afterwards.

IV. After this Operation is performed, the Wound of the Abdomen is next to be taken Care of, and stiched up, as we have shewn in the former Chapter upon that Subject, always observing the Caution I there laid down, which I cannot inculcate too frequently, of keeping the depending Part of the Wound open with a Tent, till all the præternatural Fluids are discharged from the Cavity of the Abdomen, and until the Union of the Wound in the Intestine shall render it proper to draw out the Silk with which it was stiched up.

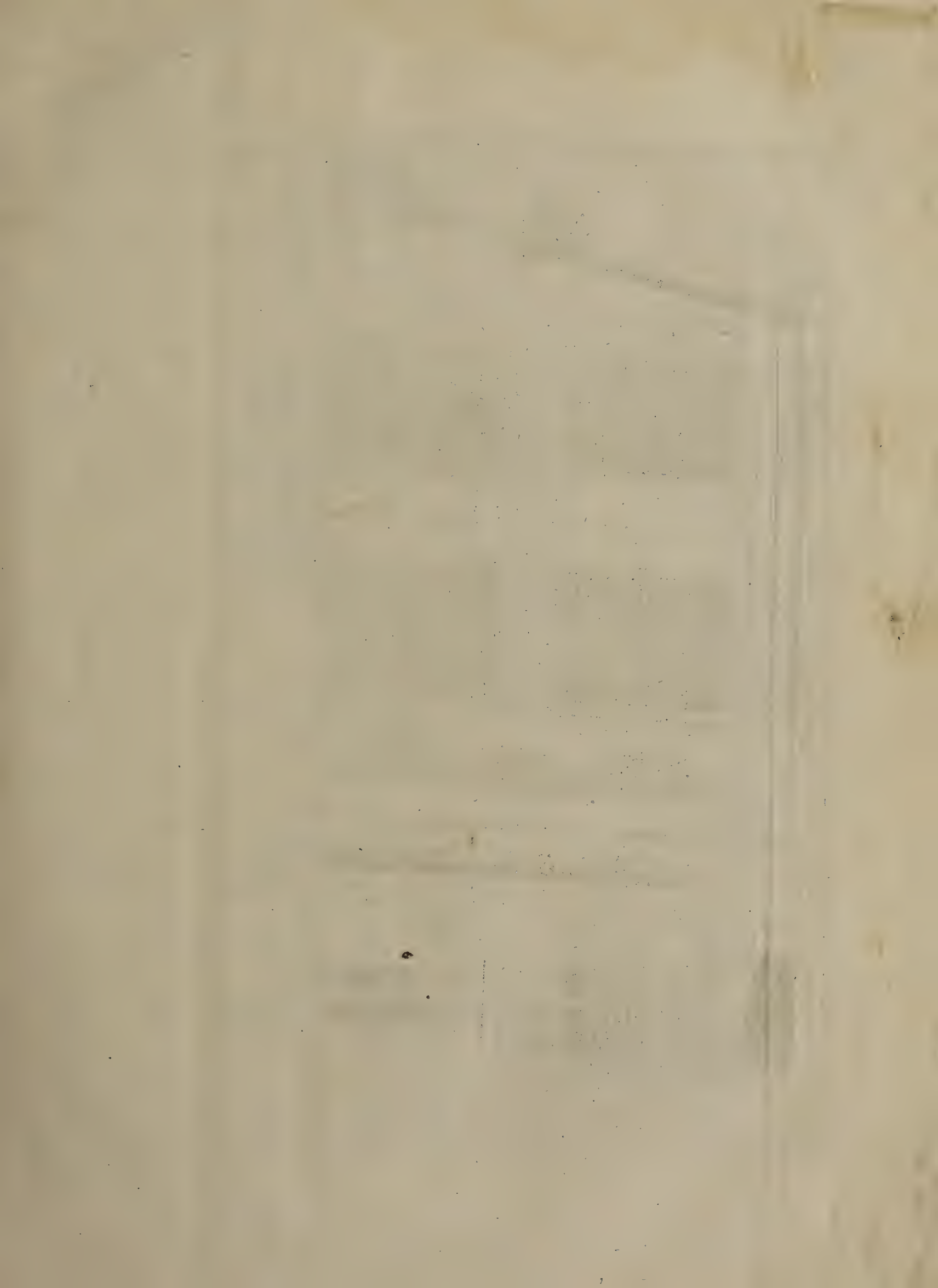
How the Wound is to be dressed.

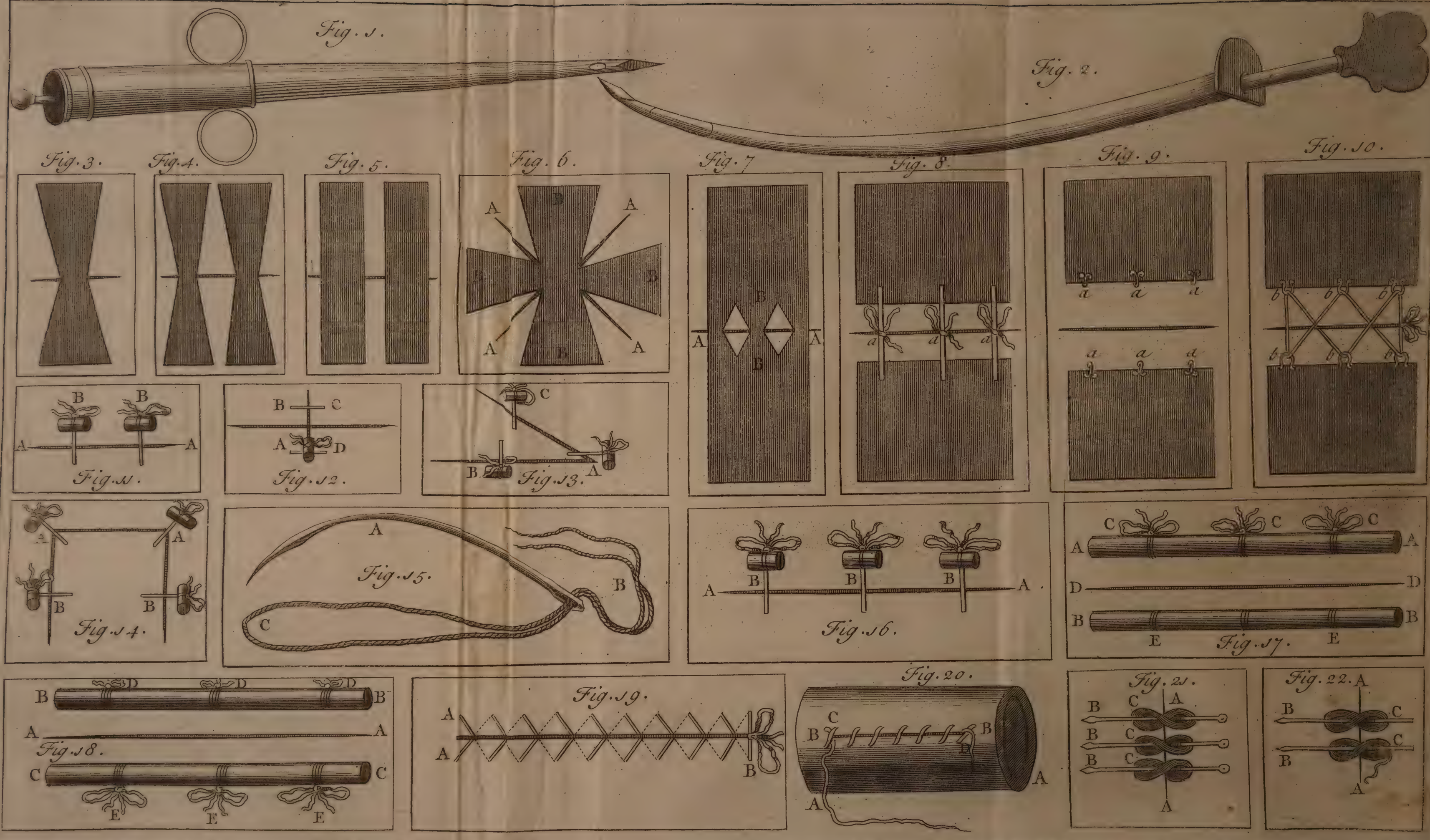
V. There is no Necessity for explaining to you the Method of cleaning, dressing, and healing the Wound. We have already spoken sufficiently on that Subject in *Chap. V, N. XIV.* and the following Numbers. Only I would furnish the Surgeon with this farther Caution, that where two Threads hang down from the Belly, one belonging to the End of the Tent, the other to the Suture of the Intestine, it will be proper to distinguish them by different Colours, to prevent mischievous Mistakes.

An easier Method of healing Wounds of the Intestines.

VI. As the modern Surgeons have found by Experience, that scarce any are saved who have received Wounds in the Intestines, and that in those few who do recover, the wounded Parts, from the Fineness of the Coats of the Gut, do not properly unite, but rather adhere to the inner Part of the *Peritonæum*, or to the *Omentum*, or to some of the other Intestines; it is no wonder, therefore, that they

entirely





intirely lay aside the Practice of stitching up the wounded Parts of the Intestine, especially with uninterrupted Stiches, like the *Glover's Suture*: which by the frequency of the Puncture brings on a violent Inflammation, the most acute Pains, Convulsions, nay, sometimes Cancer or Mortification, and Death itself. But they rather chuse now to deal more tenderly with the Patient, and to substitute a gentler Method of Cure. In Consequence of which, the present Practice is to pass a waxed Thread through a fine Needle, and with this to fasten the wounded Part of the Intestine to the internal Orifice of the Wound of the Abdomen. The Thread that hangs out of the Abdomen is to be so firmly fixed by the Application of sticking Plasters to the Wound, that the Intestine cannot recede from the Part to which it was fastened, nor can it evacuate any of its Contents into the Cavity of the Abdomen. When this Operation is well performed, the Intestine easily adheres to the internal Part of the Abdomen, and the Patient suffers infinitely less Pain and Hazard, than from the former Method of making the Sutures. The same Regulations in Diet, and the same Methods of Dressing, and the bleeding the Patient, which we advised above at *Chap. V, N. XIV. and the following Numbers*, are to be observed. The same Method of Cure will also serve for Wounds of the Stomach, where they are within the reach of the Hand, and it is sometimes crowned with Success. See BOHNII *lib. De renunciatione Vulnerum, Sect. II. Chap. V.*

EXPLANATION of the FOURTH PLATE.

Fig. 1. PETIT's *triangular Needle*, for making a new Aperture in the Part opposite to the Wound, which the *French* call *Contre-ouverture*.

Fig. 2. My Improvement upon PETIT's *Needle*, which will take place where a strait Needle cannot safely be used, See *Book I, Chap. I, N. XXXVII.*

Fig. 3. AA, represents a Wound, the Lips of which are to be united by the Sticking Plaster indented on both Sides at BB.

Fig. 4. Shews a Wound to which two Sticking Plasters are applied.

Fig. 5. A Wound of the like Nature, to which are applied two Sticking Plasters without Indentations.

Fig. 6. A Wound made cross-ways, AAAA, united by two Plasters laid cross-ways, BBBB.

Fig. 7. A Wound AA, to which a Sticking Plaster is applied, with two Openings in the Middle, BB.

Fig. 8. A Wound united by the Application of two Plasters, with Tapes fixed to each of them, which are drawn together and fastened with slip Knots, *aaa*.

Fig. 9. The same Wound with Plasters of the same kind, furnished with Hooks, *aaa*, instead of Tapes, by which, with the Assistance of Threads tied to them, the Lips of the Wound are drawn together.

Fig. 10. Another Method of doing the same Thing, used by the Antients:

Fig. 11. A Transverse Wound, AA, united by the *Interrupted Suture*, BB.

Fig. 12. Shews in what Manner a cross Wound is to be stitched up, and the Lips of it brought together by drawing the Threads tight, ABCD.

Fig. 13. Where the Stiches are to be made in a Triangular Wound, ABC.

Fig. 14. How a Wound with two Angles is to be stitched with the *interrupted Suture*, first at the Angles, AA, and then, if it is necessary, on each Side at the Letters, BB.

Fig. 15. *A large crooked Needle, for sticking large Wounds, with a double Thread, to make the quilled Suture.* A is the Needle; B the double Thread; C the Bow-end of the Thread.

Fig. 16. *A large Transverse Wound, A A, united by a Triple Interrupted Suture, B B B.*

Fig. 17. *The same kind of Wound, D D, which besides the Threads at Fig. 16. is furnished also with small cylindrical Rolls of Silk spread with some Wax or Plaster, A A and B B: the Threads on the upper Lip of the Wound are tied in slip Knots, C C C, whilst the Roll that lies on the under Lip is confined between the Bow-ends of the Threads, E E E. In a word, this shews PALFYNU'S Method of making the quilled Suture.*

Fig. 18. *Shews you another Method of making the quilled Suture in large transverse Wounds, particularly in those of the Belly, which is called Gastroraphy, See Book I, Chap. V, N. XLVII; and Chap. V, N. XVIII. A A, the Wound. B B, the upper Roll. C C, the lower Roll. D D D, the single Knots which confine the Lace, composed of six or eight Threads, and the upper Roll. E E E, the slip Knots which secure the lower Roll.*

Fig. 19. *CELSUS'S Suture, which he describes at Lib. VII, Chap. XVI, for performing the Operation of Gastroraphy with two Needles. But this is a bad Method, and out of Practice. A A, the Stiches. B B, the End where they are fastened in a Knot.*

Fig. 20. *The Glover's Suture, used for uniting Wounds of the Intestines. A A, the Intestine. B B, the Wound. C, the beginning of the Suture, with part of the Thread hanging out. D, the End of the Suture, where it is fastened in a Knot.*

Fig. 21, 22. *The Suture for the Hare Lip, which is made with two or three Needles. A A, the descending Wound. B B, Needles passed through the Lips of the Wound. C C C, the Thread twisted round the Needles.*

C H A P. VII.

Of LOSS OF SUBSTANCE *in the* INTESTINES.

What is to be done when there is a Lots of Substance.

I. **W**HERE any Part of the Intestine is carried away, the Case seems to be plainly desperate. It was therefore wonderful that Persons thus wounded did not all die upon the Spot, or in the Operation of making the Sutures: till ^aHILDANUS, ^bBLEGNY, ^cDIONYS, ^dPALFYNU, ^eJO. M. HOFFMAN, ^fSCHACHER, ^gVATER, ^hCHESELDEN, HEISTER, and others, observed, that the Lips of Intestines so wounded, would sometimes quite unexpectedly adhere to the Wound in the Abdomen; and therefore there seemed to be no Reason why we should not take this ⁱHint from Nature. Whenever therefore a Surgeon is called

^a Observ. 74. Cent. I. Obs. 72. Cent. VI. ^b Zodiac. Med. Gall. An. 2. pag. 123. ^c In Chirurg. cap. de Gastroraphia. ^d In Chirurg. cap. de Gastroraph. ^e Disq. Corp. Hum. Anat. Path. ^f In Dissert. de Morb. ex situ Intestin. ^g In Dissertat. de Vuln. in Intestin. lethal. ^h Lib. de alto apparatu.

ⁱ A Surgeon tried this first with Success upon a Dog. See BLEGN Zodiac. Gall. An. 2. p. 143. afterwards it was performed upon a Man. See Miscell. Natur. Curios. Dec. 2. An. 8. Obs. 229.

to a Case of this Kind, after he has diligently examined the State of the Upper Part of the Intestine, which has suffered a Loss of Substance, he should stitch it to the external Wound, either by the continued or interrupted Suture. For by this Means the Patient may not only be saved from instant Death, but there have been Instances where the wounded Intestine has been so far healed, that the Fæces which used to be voided *per Anum*, have been voided by the Wound in the Abdomen: Which, from the Necessity of wearing a Tin or Silver Pipe, or keeping Cloths constantly upon the Part to receive the Excrement, may seem to be very troublesome: But it is surely far better to part with one of the Conveniencies of Life, than to part with Life itself. Besides, the Excrements that are voided by this Passage, are not altogether so offensive, as those that are voided *per Anum*.

II. The same Method of Cure may conveniently enough be put in Practice, where any Part of the Intestine is mortified by being forced out of the Abdomen. For in this Case, if you tie up the mesenteric Arteries, the corrupted or mortified Part of the Intestine may be cut off, and the remaining sound Part made to adhere to the Wound of the Abdomen. For it is better to try this Method, though but few should be saved by it, than to suffer all to perish, as CELSUS observes; It is wiser to attempt a doubtful Remedy, than absolutely to despair. I once published a Cure of this Kind in a Dissertation containing various Observations, printed at *Helmstadt*.

How a mortified Gut is to be treated.

III. When the Intestines are wounded, but not let out of the Abdomen, and therefore their Wounds are out of Reach, the Surgeon can do nothing but keep a Tent in the external Wound, according to the Method of Dressing laid down at Chap. V, N. XIV. and after this, bleed the Patient, if his Strength will admit of it, advising him to rest, to live abstemiously, and to lie upon his Belly. The rest is to be left to Divine Providence, and the Strength of his Constitution. But the Question may be asked here, Whether a Surgeon may not very prudently, in this Case, enlarge the Wound of the Abdomen, that he may be able to discover the injured Intestine, and treat it in a proper Manner? Truly I can see no Objection to this Practice, especially if we consider, that upon the Neglect of it, certain Death will follow; and that we are encouraged to make Trial of it by the Success of others. SHACHERUS, in *Programmate Publico*, *Lipsie edit.* 1720, mentions a Surgeon who performed this Operation successfully. So CHESELDEN of *London* gives us an History where in the *Hernia incarcerata* he laid open the Abdomen, returned the Intestines, and perfectly cured his Patient. See his *Treatise on the High Operation*, pag. 180. and his *Anatomy*, 3d edit. pag. 283.

How concealed Wounds of the Intestines are to be treated.

IV. But what Assistance are we likely to receive from Clysters in Wounds of the Intestines? Some Physicians are very high in their Commendation, whilst others, of equal Credit, absolutely prohibit the Use of them. For my own Part, I see no Reason for carrying either Prejudice to so great a Length. The Use of Clysters is very prudently forbid in Wounds of the great Guts, but no less Judgment is shewn in prescribing them in Wounds of the small ones. In the first Case, the Clyster will make its Way through the Wound, into the Cavity of the Abdomen, to the great Detriment of the Patient; whereas in the latter, they will always prove beneficial. For the Inconvenience which attends the other, is prevented in this Case by the Valve of the *Colon*; and the Benefits that accrue from

Of Clysters in this Case.

this Application are very obvious: The useless Fæces are carried off, an equable Course of the Blood is restored, the Fever and Inflammation are much abated by it, if not entirely taken off, and the Pains greatly assuaged.

C H A P. VIII.

Of the FALLING DOWN of the OMENTUM.

Falling
down of the
Omentum.

I. **I**N large Wounds of the Abdomen, the *Omentum* will frequently protrude itself through the Wound, either alone or with some Portion of the Intestines. Whenever this is the Case, the Surgeon's first Inquiry is, Whether the protruded Part preserves its Heat, Moisture, and natural Colour? If it is not found faulty in any of these Circumstances, it must be gently returned: But where the Straitness of the Wound forbids this, the protruded Part must be taken off close to the Wound, and the Wound healed according to the common Form. The *Omentum* in this Case will adhere to the internal Part of the Wound, without bringing any Disorder upon the Patient. But where the Intestines fall out at the same time, the *Omentum* is to be fomented, by an Assistant, with warm Milk and Water, till the Intestines are returned, and then the *Omentum* must be replaced.

What is to
be done
when the
Omentum is
corrupted.

II. If any Part of the protruded *Omentum* is cold, dry, livid, mortified, or putrid, the discoloured corrupted Part must be entirely cut off before the rest is returned; lest the neighbouring Parts should be brought into consent, which would inevitably prove fatal to the Patient. GARENGEOT would have the vitiated *Omentum* returned wholly into the Abdomen, without Ligature or Incision. But that this Procedure is wrong, I shall shew more fully in the following Numbers.

How the
corrupted
Part is to be
taken off.

III. The corrupted Part of the *Omentum* may be taken off in this Manner: Take a strong waxed Thread, pass it two or three Times round the sound Part of the *Omentum*, near the Place where it is injured, and fasten it with a Knot, to prevent any Hæmorrhage ensuing after the Reduction of it. When you have made a secure Ligature, take off the corrupted Part with the Knife or Scissors; and return gently what remains sound, leaving at least the length of a Foot of the Ligature hanging out of the Wound in the Abdomen, till it slips off from the sound Part of the *Omentum*.

How the
Wound is to
be dressed.

IV. What remains with regard to the Cure of the Wound is sufficiently treated of above at Chap. V, N. XIV. and the following Numbers. The depending Part of the Wound should be kept open with a large Tent, such an one as is described Plate II, Lett. O, that a Passage may be left for an Evacuation of the Sordes from the Cavity of the Abdomen. It will be proper to give two different Colours to the Thread that hangs from the Tent, and that which belongs to the Ligature of the *Omentum*, to prevent Confusion, as we advised above, Chap. VI, N. V.

How the
Thread is to
be drawn
out.

V. At every Dressing, after the first six or seven Days, you may draw the Thread which hangs out of the Abdomen gently forwards, till it shall by Degrees slip quite off the *Omentum*. But this should be done without any Violence. When the Thread is drawn out, and you can perceive no Discharge from the Cavity of the Abdomen, you may remove the Tent, and use proper Means to heal

heal the external Wound. After which you should take away some Blood, unless there has been a sufficient Discharge before; and recommend Rest and Abstinence to the Patient.

VI. What shall we say to the unwarranted Opinion of DIONIS? who advises Surgeons never to take off any Part of the *Omentum*, but rather to follow the Example of MARESCHALL, *first Surgeon to the French King*, who, according to our Author's Account, has very frequently returned the *Omentum* without making either Ligature or Incision, and never saw any bad Consequence from this Practice. But I will venture to pronounce this Relation of DIONIS's to be very faulty, and not delivered with that Accuracy which is required in a Matter of Fact of this Consequence. We cannot learn, by this Account of his, whether the *Omenta*, which were returned in this Manner by MARESCHALL, were large or small, whether they were entirely sound, or corrupted in part. If they had received no Injury, DIONIS spends his Time idly, when he so earnestly enreats all Surgeons to follow the Steps of MARESCHALL in this Point: No body ever advised the contrary. But if they were in part corrupted or mortified, which DIONIS does not assert, it is much to be admired that the Patients felt no Inconvenience from this Practice; and what became of the corrupted Parts after they were returned, is to me Matter of great Wonder. Therefore DIONIS is by no means to be attended to upon this Point, till he speaks to it in a clearer Manner: And more particularly so, because PALFYNUS gives us the History of a Case in his Surgery, where MARESCHALL made a Ligature and Incision upon the *Omentum*, and separated the corrupted Part from the sound, before he returned it: And this he declares to be the Practice of Surgeons of the first Name in PARIS.

DIONIS's
Advice in
this Case.

VII. GARENGEOT declares himself of the same Sentiments with DIONIS, though he makes no Mention of his Name. This Author is far from being clear in describing how large a Portion of the *Omentum* was affected, which MARESCHALL, or any other, returned, without Injury to the Patient. I do not deny but that a very small Portion of the *Omentum* may be digested in the Abdomen without bringing on any considerable Mischief: But I can by no Means be persuaded that this can ever be the Case, when a large Portion of the *Omentum* is affected, except I should be confronted with many Instances of it. If by chance one Instance should be produced, this will not put the Matter out of doubt, much less serve as an Example worthy of Imitation. For miraculous Events happen now and then in very dangerous Wounds: And since grievous Symptoms are brought on by letting Sordes remain even in external Wounds, what may we not fear from the same Incident in internal Wounds, from whence they cannot possibly be discharged? A large Degree of Suppuration is to be expected when a large Portion of corrupted *Omentum* is returned into the Body: But when a Ligature is made upon the *Omentum*, and the corrupted Part separated from the sound, no such Accident can happen. The Suppuration in this Case will be very inconsiderable, and the small Quantity of Matter that is made after Reduction, will be easily discharged through the external Wound that is kept open for that Purpose by a Tent: Whereas GARENGEOT forbids the Use of Tents promiscuously (which this very MARESCHALL used with great Success) and advises you to heal the Wound as soon as possible. I am of opinion, therefore, that you should very carefully distinguish between a great and small Degree of Suppuration, because this is of greater Consequence than GARENGEOT seems

GARENGE-
OT's Advice.

seems to imagine. Since this Matter is left doubtful, and GARENGEOT no where pretends to have had Experience of the good Effects of the Practice which he espouses; but on the other hand, PALFYNUUS, who was an Eye-witness, contradicts him; I think we may very safely imitate the Examples of many excellent Surgeons, in making a Ligature upon the *Omentum*, and separating the corrupted Parts of it from the Sound, before we attempt to return it into the Abdomen.

C H A P. IX.

Of WOUNDS of other Parts of the ABDOMEN.

IF you can discover by your Eye, or by the Touch, that any other Part or *Viscus* situated in the Abdomen, suppose the Liver, Spleen, or Kidney, has received a Wound from a sharp Instrument, it will be adviseable at the first Dressing, to fill the Wound as tenderly as possible, with a good Quantity of Lint, well saturated with high rectified Spirit of Wine, or Spirit of Turpentine, securing the Dressings with Compresses and Bandage: By this Means the Hæ-morrhage will be stopped, if no large Blood-vessel is divided. But you must observe that the Lint be not removed at the first Dressings; it should remain till it drops off of itself. When you have gained this Point, the Wound may be treated according to the Rules we laid down for the Treatment of Wounds of the Abdomen. The rest must be left to God's Providence, and the Strength of the Patient's Constitution. During the Cure the Patient must be constantly kept still and low. If he is of a plethoric Habit of Body it will be proper to bleed him, to prevent Inflammation, and fresh Effusions of Blood; prescribing him also vulnerary Potions, and giving him daily two or three Doses of *Luca-tellus's* or *Meibomius's Balsam*: For these Balsams are of great Efficacy in healing internal Wounds. In hidden Wounds of the Viscera, that are not to be discovered by the Eye or by Feeling, all you can do is to take proper Care of the external Wounds, daily injecting a vulnerary Decoction, and keeping open a free Passage for the Evacuation of grumous Blood and Matter from within, ordering the same Regimen to be observed both with regard to Medicine and Diet, which we advised above, and leaving the rest to Nature, for Art can give no further Assistance.

EXPLANATION of the FIFTH PLATE.

Fig. 1. Describes a blunt Iron Needle, to pass a fine Rag or Skein of Silk, well saturated with proper Balsams or Ointments, through *Gun-shot*, or other *pervious Wounds*, after the Manner of a *Seton*.

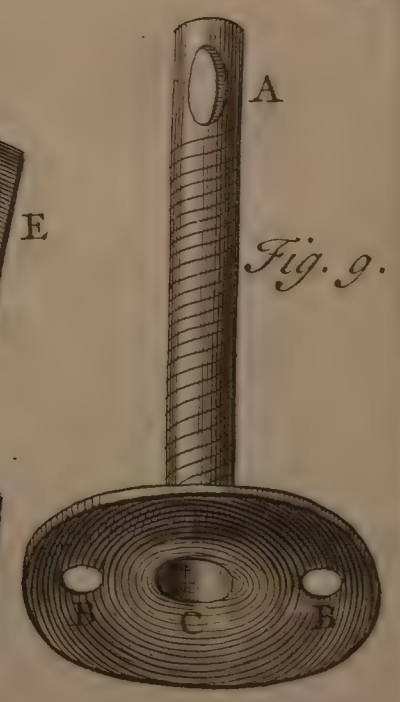
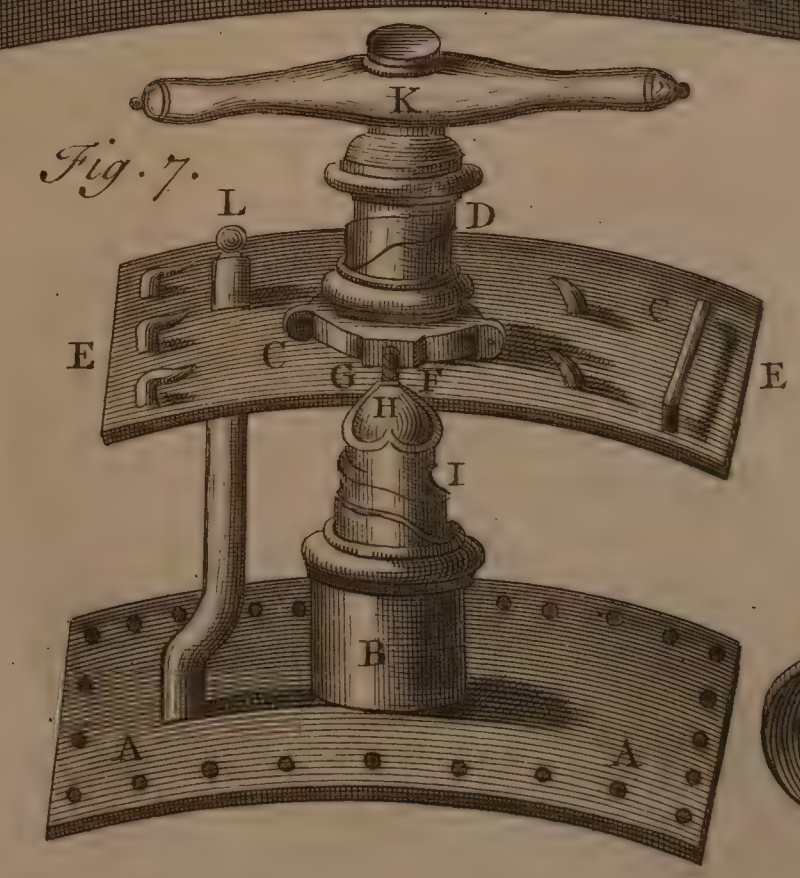
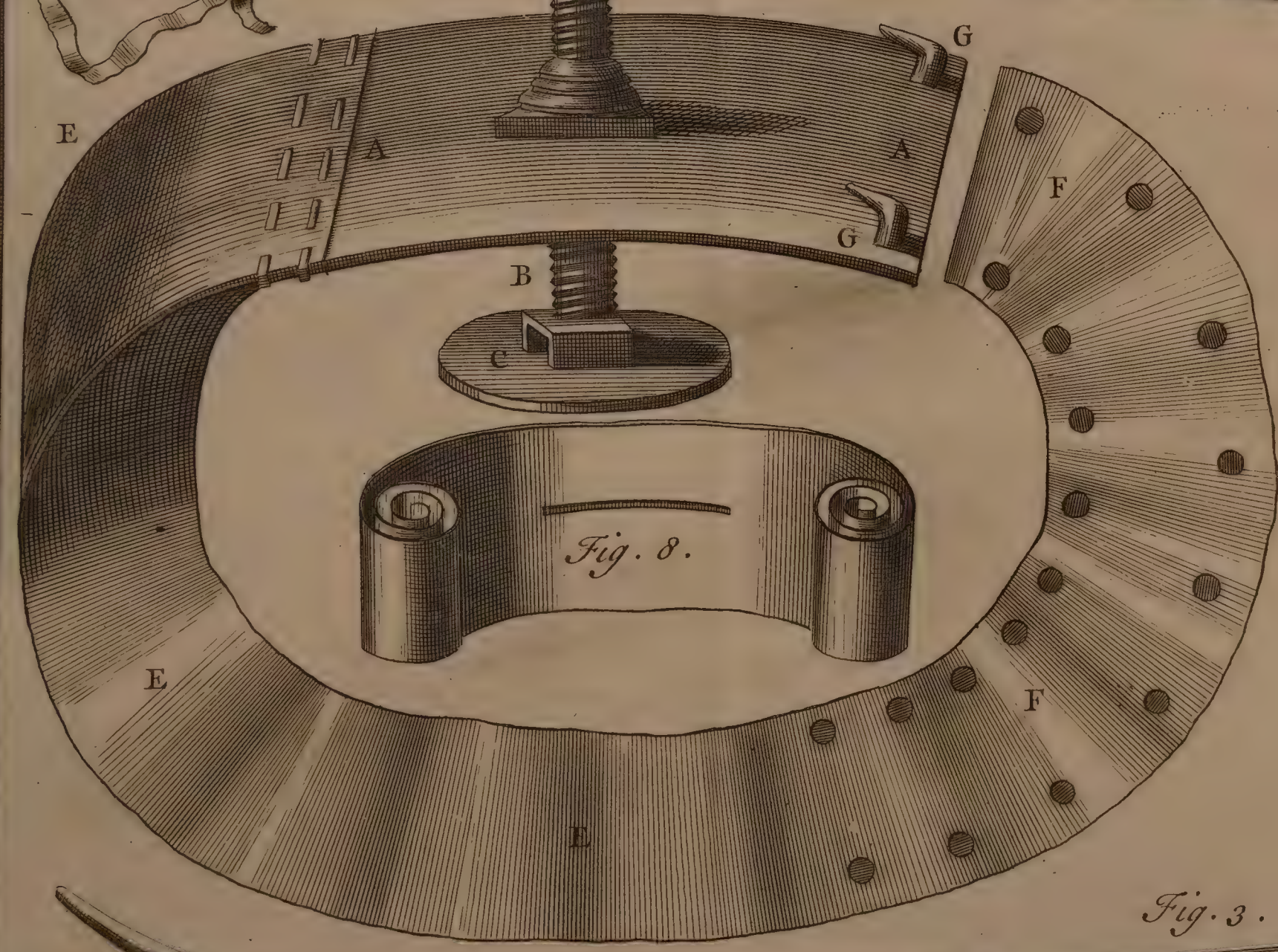
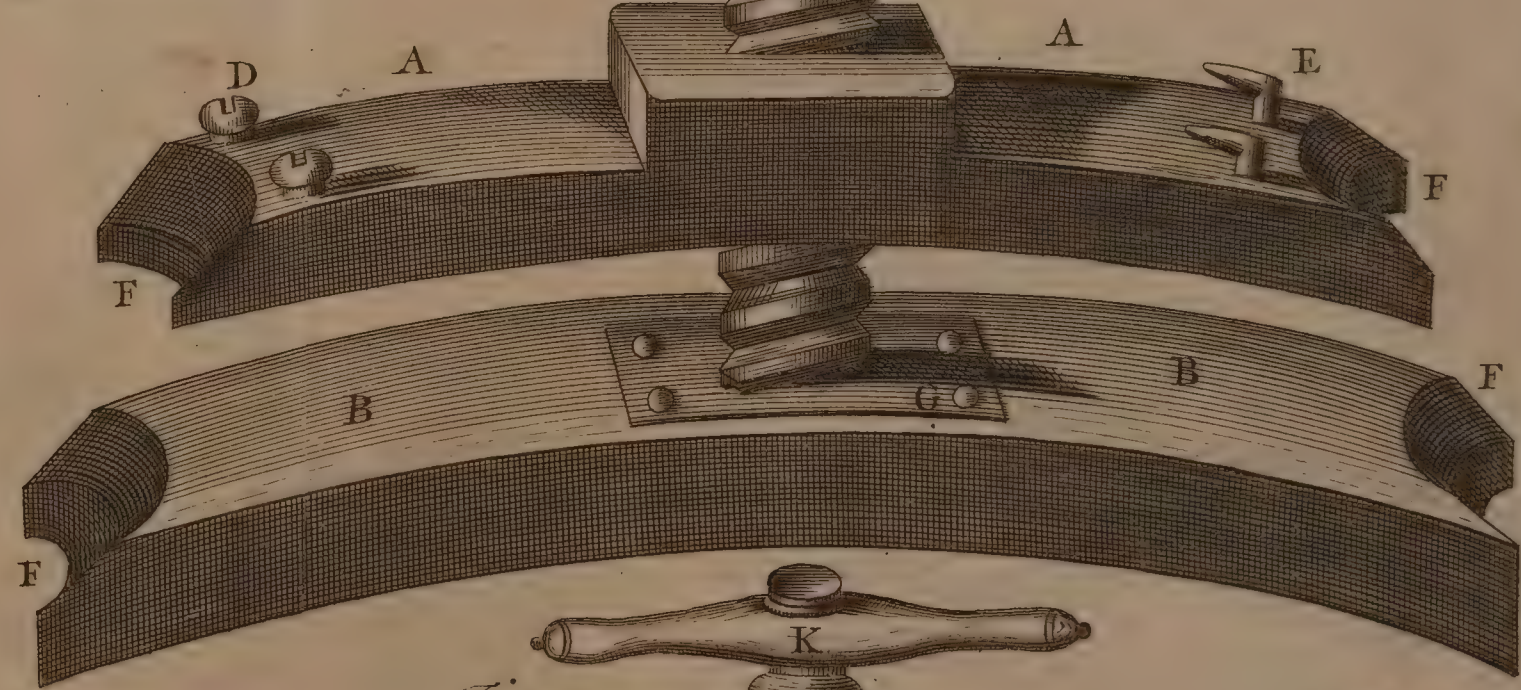
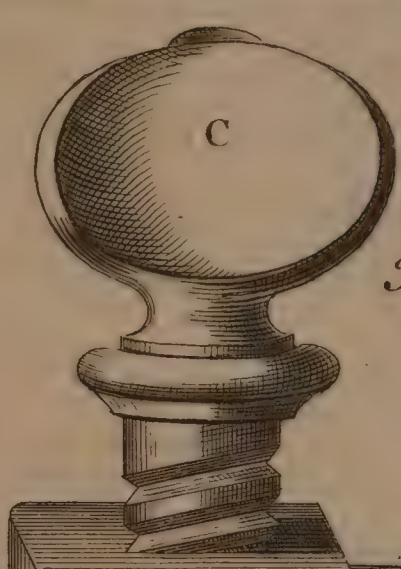
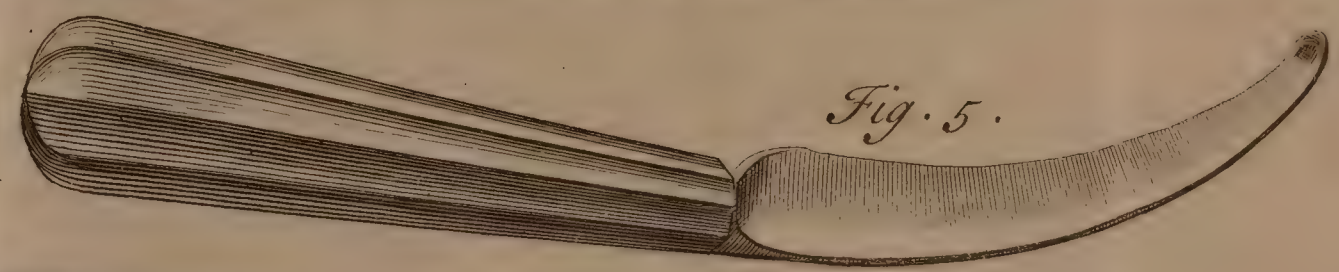
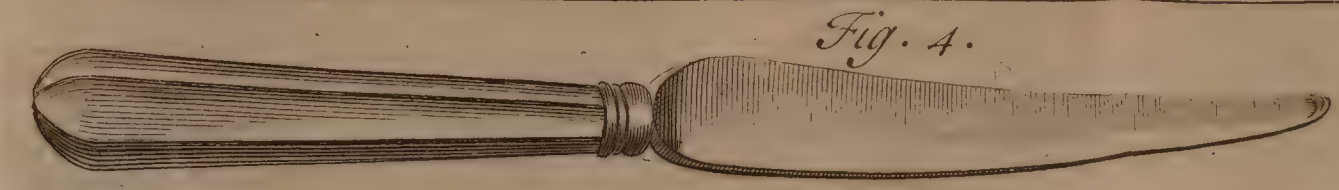
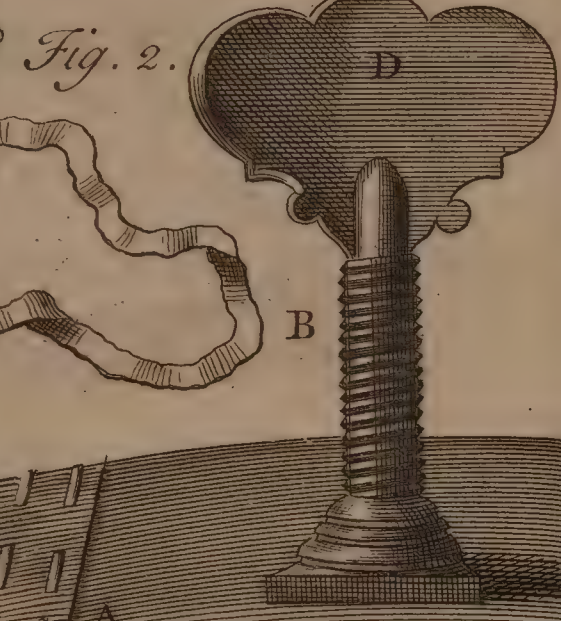
Fig. 2. An Instrument to stop the Blood in Wounds of the large Arteries, described in *Cb. II. § VIII.* from our Amendment.

AA, A Brass Plate somewhat bent.

BB, A strong Brass Screw.

C, A round Plate of a Thumb's Breadth to be fixed upon the Wound.

D, The



D. The Button which turns the Screw, and presses the Plate C strongly upon the Wound.

EE, A strong Leather Belt to surround the wounded Part.

FF, Part of the Belt pierced with several Holes, by which it may be fixed upon the Hooks G G, and lengthened or shortened according to the Size of the Limb.

Fig. 3. A crooked Knife, with a round blunt Point, to enlarge Wounds of the Thorax or Abdomen, where that Operation is required.

Fig. 4. A strait Knife with a Button on the Point.

Fig. 5. A crooked Knife with a blunt Point.

Fig. 6. A wooden *Tournequet* in its proper Size, to stop Effusions of Blood, after our Amendment described above at Chap. II, § XII.

AA, The upper Part.

BB, The lower Part.

C, The great Screw.

D, Two small Iron Screws, to which a Leather or Silk Belt is to be fixed.

E, Hooks to fasten the other End of the Belt on, when it is brought round the Limb.

FF, The Ends of the upper and lower Part of the Instrument hollowed to receive the Belt, and to keep it steady in its Situation.

Fig. 7. Another kind of *Tournequet* made of Iron; the Description is less by half than the proper Size of the Instrument. See Chap. II, § XIV. where it is largely treated of.

Fig. 8. A broad Bandage, called the *uniting Bandage*; this is perforated in the Middle, and rolls up with two Heads; it is used in dressing Wounds of the Abdomen, which are made lengthways.

Fig. 9. A flexible Silver Pipe, useful to discharge the Matter which is collected in Wounds of the Thorax, or in the Empyema.

A, The Openings at the Extremities, and on both Sides.

BB, The Plate round it, with two Holes to pass a Thread through.

C, The Passage that goes through the Pipe to A.

CHAP. X.

Of WOUNDS of the THORAX.

I. **W**OUNDS of the *Thorax*, as of the Abdomen, are divided into three Wounds of the Breast of three Sorts. The Wound is inflicted either upon the external Parts of the *Thorax* only; or else it penetrates into the Cavity of the *Thorax*, without injuring any of its Contents; or lastly, the Contents of the *Thorax* also partake of the Wound.

II. You may discover that the Wound terminates in the external Parts, and does not penetrate into the Cavity of the *Thorax*, by several Methods. 1. By the Sight. 2. By the Sense of Hearing, by which you will discover whether any Sound proceeds from the Wound at the Time of Inspiration. 3. By Feeling, when

How to discover whether the Wound is terminated in the external Parts.

when your Finger or the Probe meets with Resistance, if you attempt to pass it into the Cavity of the *Thorax*. 4. By injecting warm Water, which in this Case will return strongly upon you. 5. By the Absence of bad Symptoms, such as Difficulty of Breathing, Fainting, sick Fits, &c. which always attend a Wound that penetrates. When by these Methods of examining you are fully satisfied that the Wound does not penetrate, you may dress it with a digestive Ointment, or some vulnerary Balsam, and treat it according to the Methods which we have advised above for the Cure of slight Wounds.

What deep and oblique external Wounds of the *Thorax* occasion.

III. It sometimes happens that external Wounds run very deep and obliquely between the Muscles and the Ribs, and are thereby rendered very difficult to be cleansed from grumous Blood and Matter. The confined Matter in this Case frequently destroys the neighbouring Parts, and produces Ulcers and incurable *Fistulæ*: Nay, sometimes it makes its Way through the *Pleura* into the Cavity of the *Thorax*, and forms an *Empyema*, or brings on a *Phthisis*, or Death itself.

How they are to be treated.

IV. The Surgeon's chief Business in this Case is to clear the Sinuses from the Blood and Matter confined in them. This is to be done either by Pressure, or by ordering the Wound to be sucked by an healthy Person; by drawing it out with a Syphon, or by making further Openings with the Knife. The rest of the Cure is to be performed after the same Manner which we described above, N. II. The most proper Bandage for securing the Dressings is the scapulary with the Girdle. See *Plate III, Fig. 1.* Which Bandage must be easy, that the Blood, or Matter, confined in the Wound, may have the freer Vent.

How to empty the Wound with a Syringe.

V. The *Syringes* that are used in this Case are of very different Shapes and Sizes; some are strait, others crooked. Some Surgeons use a Tin Syringe, resembling that which we have described at *Plate VI, Fig. 8.* but twice as large: The Mouth of it is larger than the rest of the Syringe, and is of a triangular, round, or oval Figure. *Fig. 9.* represents the true Size of it. When you apply this Instrument, you must clap the Mouth of it to the Wound, and by drawing back the Handle, endeavour to fill it with Blood. The Instrument should have several Heads of different Sizes and Figures, that it may correspond with any sort of Wound. But, concerning the Excellency and Use of these Syringes, it will be worth your while to consult ANELLE, in his Treatise called *l'Art de Succer les Playes.*

How to discover if the Wound penetrates the Cavity.

VI. You will discover the Wound to penetrate into the Cavity of the *Thorax*; 1. By the Sight, when you can plainly see into the Cavity. 2. By the Sense of Feeling, when you can pass your Fingers or Probe into the Cavity. 3. By the Hearing, if the Patient makes a particular sort of Noise in drawing his Breath. 4. From the Action of the Air of the Lungs upon the Flame of a Candle, or Feathers, when they are held near the Mouth of the Wound. 5. By warm Water meeting with no Resistance, when it is injected into the Wound. 6. Lastly, from the sudden Appearance of violent Symptoms, such as Difficulty of Breathing, Sickness, Fainting, &c. which are brought on by the Pressure which the Lungs are sensible of from the external Air, from a Collection of Blood in the *Thorax*, or from both Causes together.

VII. When

VII. When a large Quantity of Blood is spilt, and falls into the Cavity of the *Thorax* (which must sometimes be the Case) the Expansion of the Lungs, the Office of Respiration, and the Course of the Blood through the Lungs will certainly be impeded; and the Blood by frequent Delays and Obstructions being entirely inspissated in the Lungs, Life can no longer be supported. But where the Quantity of extravasated Blood is not large enough to obstruct the Lungs in their Office, the chief Danger that the Patient labours under is, that the extravasated Blood should putrify by Degrees, and corrupt the Diaphragm, Pleura, or Lungs; which will bring on very bad Symptoms, and in a short Time Death.

what proceeds from a Collection of Blood in the *Thorax*.

VIII. The following Symptoms discover an Extravasation of Blood in the *Thorax*. If, 1. There is a great Difficulty of Breathing, except when the Patient is placed in an erect Posture. 2. If the Patient lies easiest upon his Back or wounded Side, but finds any other Posture exceeding troublesome, or sometimes impracticable. 3. If he feels a Weight upon the Diaphragm. 4. If he perceives the Undulation of a Fluid upon turning the Body round. And, 5. lastly, If there has been little or no Discharge of Blood from the Wound.

Symptoms of extravasated Blood in the *Thorax*.

IX. When it appears by these Symptoms that there is a Collection of Blood in the *Thorax*, we must use our utmost Diligence to get it out, lest it should lay a Foundation for great Mischief. Therefore, 1. When the Wound is inflicted upon the Middle, or lower Part of the *Thorax*, and has not a very narrow Opening, it will be convenient to lay the Patient upon the ^a wounded Side, advising him to fetch his Breath as deep as he can, or to cough. If the current of Blood is obstructed by any thick grumous Parts, which will sometimes stop up the Orifice of the Wound, they must be removed with your Finger, or with the Probe, or drawn out with a Syringe, or by Suction. 2. If you are called so late that the Blood is become too thick to flow out of the Wound, you will be obliged to use an attenuating Injection; which may be made of a Decoction of Barley, with the Addition of some common Honey, or Honey of Roses, and a small Quantity of Soap; this is to be injected, not over-warm, into the Cavity of the *Thorax*, and then the Patient is to be so situated as to let it run out again. This Operation is to be repeated till it appears that all the grumous Blood is washed away. The Syringe, which you will see described in *Plate VI*, *Fig. 8.* with the Pipes, *Fig. 10, 11.* will execute this Intention very properly. 3. But if the Wound is so narrow or oblique that this Method cannot be prosecuted, it should be enlarged, either with the common Incision Knife and Director, or with one of the Knives described at *Plate V*, *Fig. 3, 4, 5.* This Caution is always to be observed, that is, to be very careful not to fatigue the Patient too much, by endeavouring to discharge all the extravasated Blood at one Time. If the Patient is very weak, it is better to do it at proper Intervals, especially if you discover any Tendency in him to Swoonings. It will be necessary in the mean Time to keep the Wound open by the introducing a Lead or Silver Pipe into the Wound, such as are described at *Plate II*, *Lett. Q, R, S,* or rather that flexible one at *Plate V*, *Fig. 9.* Though some, instead of a Pipe use a Tent with a long String at the End of it, dressing up with pro-

How to get the Blood out of the *Thorax*.

^a DIONIS, in his *Surgery*, relates a Case of this Kind, where he left his Patient all Night inclined upon the Wound without dressing him, and he afterwards recovered him. DE LA MOTTE confirms this by an Instance he gives us of the same Kind, that occurred to him in his Practice. See his *Observationes Chirurgicae*.

per Plasters and Compresses, securing the whole with the Scapulary, repeating this Method of dressing till the Discharge shall entirely cease, and the external Wound can be conveniently healed.

How the
Blood is to
be discharged
when the
Wound is in
the upper
Part of the
Thorax.

X. When a Wound is made in the upper Part of the Breast, or between the upper Ribs, then the Method we have prescribed of turning the Patient upon the wounded Side, will be of very little Service in discharging the extravasated Blood; for no Posture will satisfy this Intention in this Case but standing upon the Head. In this Case, if no Relief is to be expected from the Syringe or from Suction, an Opening should be made in the lower Part of the *Thorax*, which Operation the Surgeons call the *Paracentesis*. The Opening must be between the second and third Rib, counting upwards, if it is on the Left Side; but on the Right Side, between the third and fourth, about a Hand's Breadth from the Spine. The Place where you intend to make the Opening should be marked with Ink. The Instrument that is generally used upon this Occasion is called a *Trocar*: It should be driven above the Rib into the *Thorax*, with great Caution and Gentleness. After it has penetrated, draw out the Steel Instrument, leaving in the Pipe through which it was conveyed, as a Channel for the Blood to pass off by: But if it does not readily pass, its Evacuation may be forwarded by Suction, or a Syringe. But as the Lungs are very liable to be wounded by passing this Instrument forcibly into the Cavity of the *Thorax*, it is best, in my Opinion, to divide the common Integuments, the Intercostal Muscles and Pleura, with an Incision Knife, carefully avoiding the Lungs, which are very apt to adhere to the Pleura in this Part. When the Perforation is properly made, it is to be kept open in the Manner we have already shewn, and the Wound above is to be healed as soon as possible.

What is to
be done when
the Lungs
adhere.

XI. As the Lungs frequently adhere to the Pleura, the Perforation of the *Thorax* requires great Circumspection in the Surgeon. The Pleura should be divided with all possible Tenderness; and when that is done, the Surgeon should examine whether the Adhesion of the Lungs may not safely be removed with his Fingers or the Probe. When the Adhesion is very firm, the Pains we have taken to perforate the *Thorax*, and to discharge the extravasated Blood, all prove fruitless. We must in this Case make an Incision in another Part, either before, or on one Side; and proceed as above.

How
Wounds of
this kind are
to be treated.

XII. The Cavity of the *Thorax* being thus cleansed, the Wound is to be dressed but once every Day: Each Dressing should be performed with all possible Expedition, and the utmost Diligence should be used to guard the Contents of the *Thorax* from the external Air. At the Time of dressing, a Chafing-dish of hot Coals should be held near the Wound to warm and thin the Air; and if too great a Quantity of Air is already got into the Cavity of the *Thorax*, it must be drawn out with a Syphon. This being rightly performed, the Wound is to be dressed up with the utmost Expedition.

If any of the
Contents of
the *Thorax*
are wound-
ed.

XIII. When any of the Contents of the *Thorax* are wounded, as the Heart, the Aorta, the Vena Cava, the Pulmonary Artery or Vein, the Oesophagus, Thoracic Duct, the Mediastinum, or a large Portion of the Lungs (especially if it is a Gun-shot Wound) Death comes too suddenly to give the Surgeon Room to exercise his Art. On the other hand, when the Lungs are only slightly wounded, that is, when only the smaller Ramifications of the Pulmonary Vein or Artery, or the Aspera Arteria are divided, the Case is very dangerous, but

but not always mortal. Though Persons who recover after Wounds of this Kind, are more obliged to the Soundness of their own Constitutions, than to their Surgeon's Skill.

XIV. We may reasonably apprehend that the Lungs are wounded, when the Patient voids a great Quantity of frothy Blood by the Mouth, accompanied with a Cough, especially when at the same Time the Blood which is voided at the Wound is very florid, and the Patient makes a particular Noise when he draws his Breath. The Office of the Surgeon here seems to be to clear the internal Part of the *Thorax* from the extravasated Blood, and to heal the external Wound: The Methods of doing which, we have already explained. No Application can be made to the internal Wound: That must be left to Nature. Whenever the divided Vessels contract themselves, and the Blood stops of itself, the Patient will recover: Though Persons who have recovered from these Wounds are remarkably subject to Ulcers of the Lungs and Consumptions. Whenever any of the larger Pulmonary Vessels are divided, the Violence of the Hæmorrhage either brings present Death with it; or, if it ceases a little, it returns again, and comes to the same End by slower Paces. To prevent this as much as possible, it will be proper to keep the Patient quite still for several Days, he should scarce speak, he should take cooling and agglutinating Medicines, and avoid all sharp Things, all that heat the Blood, or provoke Coughing; and, if his Strength will permit it, he should lose Blood by the Arm.

XV. Sometimes the wounded Part of the Lungs pushes forward, and sticks pretty firmly in the Orifice of the external Wound, as FONTANUS, TULPIUS, and RUYSCHE have observed in their Writings. In this Case, if it is forced back again, it will discharge a great Quantity of Blood into the Cavity of the *Thorax*: Therefore it is better to let it remain in the Situation you shall find it, for by this Means it will admit of the immediate Application of proper Dressings, and you may safely encourage it to adhere to the Lips of the external Wound. And here the Patient must be strictly admonished to keep as still as possible. But if a^a wounded Portion of the Lungs should be pushed out of the *Thorax* beyond the Limits of the external Wound, you should wrap a Piece of fine Linen round this Part, and make a Ligature above the Linen, taking off all that is below the Ligature with the Knife, and returning the sound Part of the Lungs into the Body, keeping one End of the Ligature constantly hanging out at the external Wound. When you have proceeded in this Manner, keep the Wound open with a Tent, till the Ligature can safely be drawn out. How the external Wounds should be treated we have sufficiently explained already.

XVI. As to the Medicines which are to be prescribed for internal Use, they consist chiefly, after the Hæmorrhage is over, of vulnerary Decoctions, giving at due Distances of Time a Dose of *Balsamum Lucatelli, vel Meibomii*, observing particularly a strict Regulation with regard to Diet. By following these Rules a Surgeon may sometimes save a Patient that has received a Wound of this Kind, at least, where it was impossible to perform a Cure, he will have the Satisfaction of having done his Duty.

^a HILDANUS, *Cent. II. Obs. 3.* relates a Case of this Kind, where a Portion of the Lungs forced its Way through a Wound of the *Thorax*; and Part of it appearing black and corrupted, he took it off with a red hot Knife, and then forced the sound Part back again into the Body. The Patient, he tells you, survived this, and recovered a perfect State of Health.

EXPLANATION of the SIXTH PLATE.

Fig. 1. A Brass *Tournequet* after PETIT's Manner, but with some Alterations: The Use of this Instrument, and Method of applying it, will easily appear, if you compare it with what we have said above in *Chap. II. Of Wounds.* § XV. and afterwards in the *Explanation of the fourth Plate, Fig. 2, and 6.*

Fig. 2. A Handle to fix Needles in when you are to make Sutures: This the French call *Portaiguille.*

Fig. 3. Another of the same Sort from GARENGEOT.

Fig. 4. PETIT's Handle for Needles.

Fig. 5. A Needle to perform *Gastroraphy.*

Fig. 6. Another of a larger Size.

Fig. 7. Another, which is new, to perform the same Operation.

Fig. 8. A Syringe for various Uses, furnished with Pipes of different Sorts; by the Help of this you may not only inject Fluids into Wounds of the Abdomen and Thorax, into the Fauces, into Abscesses, Ulcers, and into the Uterus; but you may also by the Assistance of this Instrument draw extravasated Blood from the Cavity of the *Thorax*, in which Case the Syringe should be twice as large; the Mouth of the Pipe A should be triangular, and about two Thumbs Breadth.

Fig. 9. Another Pipe with a round Mouth, intended for the same Uses.

Fig. 10. A smaller Pipe, which may be fastened to the Syringe, *Fig. 8.* for various Uses.

Fig. 11. Another somewhat curved, and perforated on both Sides: This will serve to suck Blood out of the Cavity of the Thorax, and to throw Injections into that Part, or into the Fauces.

Fig. 12. Another, perforated at the End like a Cullender.

Fig. 13. Another like the former, but curved, to throw Injections into the Uterus, and for other Uses.

Fig. 14. An Iron Instrument like an Ear-picker, for various Uses.

CHAP. XI.

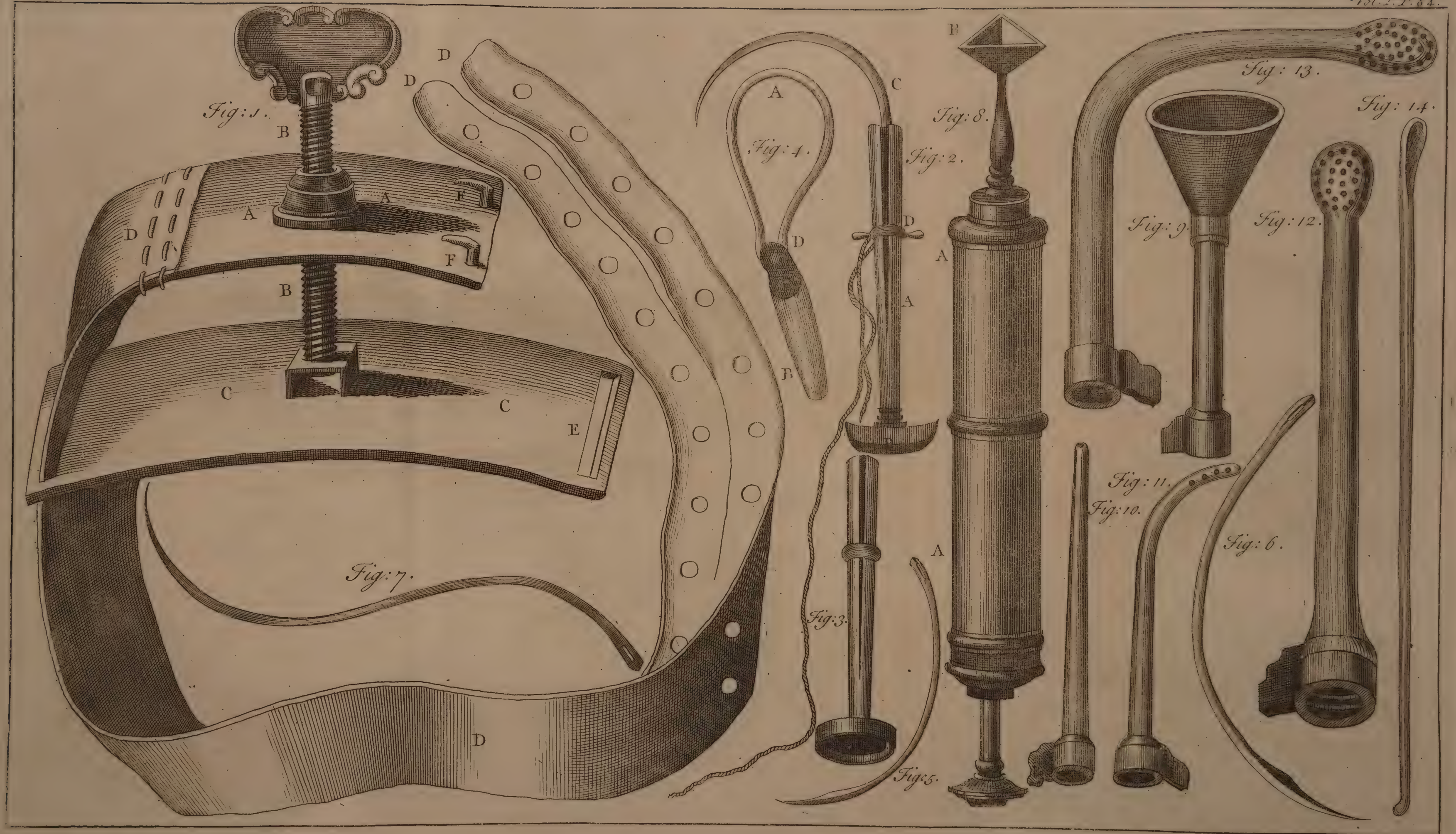
Of WOUNDS of the NECK.

Wounds of
the Neck of
bad Conse-
quence.

I. **W**OUNDS of the Neck are no less dangerous than those of the Thorax or Abdomen; insomuch, that I am surprized to find several Chirurgical Writers treat of Wounds of this Class slightly, as if they were scarce worthy of their Notice. And I have often wondered, and complained of it in my Anatomy, (Sect. 264.) that in the Division of the Trunk the Neck should be omitted.

How many
Kinds of
Wounds of
the Neck.

II. There are several Sorts of Wounds in the Neck. Sometimes the Seat of the Wound is only in the common Integuments, and the muscular Flesh: This is attended with very little Danger: But the most dangerous, and indeed generally incurable Wounds, are those of the larger Blood-vessels in these Parts: Such are those of the jugular Veins, carotid and vertebral Arteries; or where the *Aspera Arteria* is wounded; or the Gula; the Medulla Spinalis; the Nerves that



that descend by the Neck; (such as the Par Vagum, the Intercoſtales, and the Diaphragmatici) or where ſeveral of theſe Parts are wounded at the ſame Time.

III. You will eaſily diſcover with your Eye, or by conſidering the Situation of the Wound, and the Symptoms that attend it, what Parts of the Neck are the Subjects of the Wound. After this Diagnostic, the Prognotic of thoſe Wounds will eaſily follow. For whoever is thoroughly acquainted with the Condition of a Wound, will find no great Difficulty in determining the Event of it. Where the common Integuments and Muſcles alone are wounded, you will have no reaſon to dread any very ill Conſequences. But where any of the other Parts of the Neck are Partakers of the Injury, you have reaſon to apprehend the greateſt Danger; becauſe moſt of thoſe Parts are abſolutely neceſſary to Life itſelf: Though in this Caſe, where the Wound is ſmall, there are ſome Hopes of a Cure.

Diagnostic
and Prognos-
is.

IV. Wounds of the Arteries in the Neck are ſcarce ever to be remedied, unleſs the Wound be very ſmall indeed; for in this Caſe the Patient uſually bleeds to Death before a Surgeon can be called to his Aſſiſtance: Though to ſay Truth, if a Surgeon were preſent at the Inſtant ſuch a Wound was inflicted, all his Art and Induſtry would have little or no Effect: For it is extremely difficult to ſtop Blood in this Part, not only from the Largeneſs of the Arteries here ſituated, and from their Vicinity to the Heart; but becauſe it is impoſſible in this Place to make a ſufficient Preſſure upon the wounded Veſſel. Yet the Wounds of the external carotid Arteries, and the Hæmorrhages they occaſion, are more eaſily managed; eſpecially if an experienced Surgeon be applied to in Time.

What hap-
pens after
Wounds of
the Arteries
in the Neck.

V. A Wound upon the external Jugular Vein is not attended with much Danger, if a Surgeon is called in Time; for a ſmall Degree of Preſſure is required here, as appears by the frequent Practice of Blood-letting in this Part. But Wounds of the internal Jugulars are extremely dangerous; and this partly from their Size, which is uſually larger than one of the Fingers; partly becauſe their Situation is ſo deep, that no proper Application can reach them to any Advantage. For theſe Reaſons many Surgeons have determined Wounds of this Kind to be mortal; but I can by no Means admit this as an abſolute Rule, without any Exceptions. On the contrary, I am of Opinion, that where the Wound in the internal Jugular is made by a ſharp Inſtrument, and but ſmall, if a Surgeon is ready at hand, the Patient may be ſaved. How this is to be effected I ſhall reach below.

After
Wounds of
the Veins.

VI. Wounds of the *Aſpera Arteria* were uſually deemed mortal by Chirurgical Writers: I am ſo far from contradicting them in this Sentence, that I ſhall rather endeavour to ſupport it, that is, where the Wind-pipe is entirely divided, or wounded in its lower Part within the Cavity of the Thorax, or joined with a Wound of the carotid Arteries or internal Jugulars, which is frequently the Caſe. But on the other hand, if it is only wounded in the fore Part, and the neighbouring Veſſels remain unhurt, it is undoubtedly curable; which Opinion is ſtrongly ſupported by variety of Examples from my own Experience, and that of other Practitioners. See above *Cb. I. N. XIX.*

Wounds of
the Aſpera
Arteria.

VII. There are very little Hopes of Recovery where the Gula is much wounded, or entirely divided; becauſe not only the Office of Deglutition is cut

Wounds of
the Oeſoph-
agus.

^a See BONNIUS *de Vuln. Lethal.* Cap. ii. p. 23.

^b Ibid. Sect. II. Cap. iii. pag. 121.

off, but the Part is so situated, that it is almost impossible to wound it without injuring at the same Time some of the neighbouring Nerves and Blood-vessels. But when the Gula is the only Subject of the Wound, and the Opening is very small, the Wound may sometimes admit of a Cure.

Wounds in
the Medulla
Spinalis and
Nerves.

VIII. Wounds on any Part of the *Medulla Spinalis* are very dangerous, but more particularly so when inflicted upon that Part of it which passes through the Neck. Therefore it is no Wonder that scarce any one recovers after a considerable Wound of this Kind. The Reason of this will immediately appear, when we consider, that several Nerves proceed from this Part, which are absolutely necessary to conduct the Œconomy of the Animal; that the vertebral Veins and Arteries will almost always be wounded at the same Time; and that the Situation of these Parts is such, that it is impossible to convey the proper Remedies to them. Nor are Wounds of the large Nerves of the Neck, such as we mentioned at N. II. less dangerous than these: For if they are divided, the nobler Parts of the Thorax or Abdomen, to which Nature hath determined them, will immediately lose their Assistance, and of Consequence become unequal to the Offices for which they were intended.

How slight
Wounds of
the Neck are
to be treated

IX. The Treatment of Wounds in the Neck is different, according to the different Nature of the Wound. When the common Integuments and muscular Flesh are the sole Subjects of the Wound, it will require the same Method of Treatment which we have advised above for all slight Wounds, upon what Part soever they may be inflicted. Where the external Jugular is wounded, the same Methods which we use after bleeding in that Vein will be sufficient.

Cure of a
Wound in
the Internal
Jugular.

X. When the internal Jugular Vein has received a small Wound, the Hæmorrhage will easily be stopped by filling the Wound well with dry Lint, or steeped in *Alcohol. Vini*, or *Spirit. Terebinth.* or any proper styptic Medicine; or with the Fungus called *Crepitus Lupi*; laying over these Applications square Bolsters, and securing all with a Bandage, drawn as tight as the Situation of the Part will admit. An Hæmorrhage is much easier suppressed in a Vein than in an Artery: The whole of the Cure depends upon the Degree of Pressure that you can make upon the wounded Vessels. Sometimes it happens that the Method of dressing which we have just advised in this Case will have no Effect: When this shall happen, the Surgeon or his Assistant must keep his Finger constantly upon the Wound, or make a Pressure upon the Part, with such an Instrument as we described in *Plate V, Fig. 2.* till the Hæmorrhage is entirely stopped. This Pressure should usually be continued for a Day or two. The same Process should also be observed in Wounds of the vertebral Veins and Arteries. After the Blood is stopped, the Dressings should continue upon the Part untouched till the third Day, and then a vulnerary Balsam and Plaster may be applied to heal the Wound.

How a large
Wound of
the Internal
Jugular is to
be treated.

XI. When the internal Jugular Vein has received a large Wound, or is entirely divided, the Patient will presently die with the Loss of Blood. But if a Surgeon should be present when such a Wound is received, or should come in instantly afterwards, I would advise him to make a Pressure upon the divided Vein with his Finger, and to enlarge the Wound upwards and lengthways, till he can come at enough of the Vessel to make a strong Ligature upon it by the Assistance of a crooked Needle, such as I have described, *Plate VIII, Fig. 4;* and then he may fill up the Wound, and treat it as at N. X. By this Means
the

the Life of the Patient may be saved, though the Course of the Blood through this Vessel be entirely cut off. I have often tried this Experiment upon a Dog, and he has recovered, and never suffered any apparent Inconvenience from it. Therefore I think it better to put this doubtful Remedy in Execution, than to leave the Case as desperate.

XII. A Wound in the carotid Artery is attended with greater Danger than a Wound in the internal Jugular: But if a Surgeon is present when the Wound is received, I think he should make the same Attempts to cure it. This is more likely to meet with Success in Wounds of the upper and middle Part of it, than in Wounds of the lower Part. But where the Wound is not in the Trunk of the Artery, but in one of its Branches near the Head, you should fill up the Wound with Lint, dipped in some styptic Liquor, if you have it ready; then cover it up with thick Compresses, securing all with a tight Bandage, and ordering an Assistant to make a Pressure upon the Part for some time with his Hand. See Part III. Ch. II. N. VIII. and Plate 37. Fig. 8. By these Methods I have very successfully stopped violent Hæmorrhages, that have proceeded from wounded Branches of the carotid Artery, which I have divided in taking out large schirrous, parotid, or submaxillary Glands. In these Cases you should never remove the Dressings till the third or fourth Day. Nor should the Lint, applied at the first Dressing, be forced out; but remain in the Wound, till it works its own Way. Otherwise a fresh Hæmorrhage, and that very violent, most commonly ensues (I speak from Experience) by which the Patient's Life may be greatly endangered.

How a Wound in the carotid Artery is to be treated.

XIII. In curing Wounds of the *Aspera Arteria*, the Surgeon ought, after cleansing the Wound, to endeavour to unite the divided Parts by the Assistance of sticking Plasters; or, where the Wound is large, by making two Stiches with a crooked Needle, dressing them up afterwards with some vulnerary Balsam, a sticking Plaster, and proper Compresses, advising the Patient to keep his Head in a prone Situation. ^a The Wound thus treated will easily heal, if it is made either by Puncture or by a cutting Instrument. But if any Part of the *Aspera Arteria* is carried away by a Bullet, the Suture is to no Purpose: Wounds of this Kind are more readily healed and filled up by the Use of a digestive Ointment, or vulnerary Balsam. But this must be particularly remembered, that the Head be kept in a prone Situation. If the *Aspera Arteria* is entirely divided, and the lower Part of it contracts itself into the Cavity of the Thorax, so that it cannot be laid hold on, and united to the upper Part, the Patient must undoubtedly die. If the Artery is not entirely divided, the Surgeon must raise the lower Part, and unite it to the upper by Suture ^b.

How to treat Wounds of the Aspera Arteria.

XIV. Where the *Œsophagus* is wounded, whatever the Patient attempts to eat or drink passes through the Wound, and he is usually attended with Hiccoughs and Vomiting. Where the *Œsophagus* is entirely divided, there is no Possibility of curing it; but where it is only perforated or wounded in part, you may attempt the Cure by dressing the Wound with a vulnerary Balsam, by endeavouring to unite it with sticking Plasters, and by advising the Patient

How to treat Wounds of the Œsophagus.

^a Cures of this Kind are to met be with in BARTHOLIN, in *Hist. Anatomic. Cent. V. Hist. 89.* and in TULPIUS, *Obs. Lib. i. Cap. 50.* and in other Writers; many of whom GARENGEOT has quoted, Tom. ii. C. de Bronchotom.

^b A remarkable Instance of this is related by GARENGEOT, *Op. Chir. Tom. ii. C. de Bronchotom.* to

to a strict Abstinence for some Days, or at least to take Nourishment by the Mouth very sparingly, at the same Time prescribing nourishing Clysters of Broths or Milk. But when the Necessities of Nature require Nourishment to be taken by the Mouth, the Wound should constantly be diligently cleaned afterwards, lest any Part of what was taken should stick by the Way and putrify, which would bring on very bad Symptoms*. After the Wound is cleaned in this Manner, it is to be dressed daily with some vulnerary Balsam till it heals. But if the *Œsophagus* be wounded within the Thorax, the Situation is such that Art cannot reach it: The Cure must be left entirely to Nature.

How
Wounds of
the Medulla
Spinalis are
to be treated.

XV. Wounds of the *Medulla Spinalis* are best dressed with the *Balsamum Peruvianum*, *Essentia Myrrhæ aut Succini*, *Spiritus Mastichis*, or with Medicines of the like Nature, mixed with a small Quantity of *Mel Rosarum* spread upon Pledgits, and applied moderately warm; and then covered with a vulnerary Plaster. The Event must be left to God's Providence, and the Strength of the Patient's Constitution. Slight Wounds of these Parts sometimes heal by this Method; but large Wounds here bring certain Death.

How to treat
wounded
Nerves in
the Neck.

XVI. Wounds inflicted upon the large Nerves which are situated in the Neck, are generally mortal; but where the Wound is very small, the same Methods may be attempted which we advised in the Wounds of the *Medulla Spinalis*.

CHAP. XII.

Of WOUNDS of the HEAD in general.

Wounds of
the Head
very dangerous.

I. **N**O Wounds are attended with more Danger than those which are inflicted upon the Head; for the slightest Injury of the Brain will frequently bring on the worst of Symptoms, and even Death itself. Nay, Wounds of the Head which do not penetrate into the Cranium, and proceed only from a slight Fall or Stroke, even with a blunt Instrument, sometimes occasion a Rupture of some of the internal Blood-vessels, and an Extravasation of Blood in the Brain, which is attended with the most mischievous Consequences. Therefore even the slightest Wounds of the Head require all the Care and Caution that we are Masters of.

Wounds of
the Head are
of two kinds.

II. We ought carefully to distinguish, 1. What Parts of the Head are wounded; and, 2. In what Manner the Wound was made; for some Wounds of the Head are made with acute Instruments, either by stabbing or cutting; some are made with blunt Instruments, which is the Case in some Blows or Falls, and in Gun-shot Wounds. These of the last Class are attended with much greater Danger than those of the former; for they generally give such a violent Shock, as to burst the finer Vessels and Nerves of the Brain.

What Parts
are wounded.

III. As to the Parts which are wounded, they are either the common Integuments alone, or with these the Flesh of the Face, or the Pericranium, or the temporal Muscles, or the Cranium; or sometimes the internal Parts also; next,

* The abovementioned Author, in Cases where the Patient could not swallow, recommends the Use of nourishing Clysters.

the Dura Mater, Pia Mater, and the Brain, either in its cortical or medullary Part, or in its Ventricles. When the Cranium is wounded, as first the inner Lamina of the Cranium, from whence Fragments are often splintered, and driven into the Dura Mater or the Brain itself; it is either cut, broken, or contused. It may not be amiss to divide Wounds of the Head into two Classes; 1. Those that affect the Face. 2. Those that hurt or wound the Cranium, the Castle of the Brain, or some of its Integuments.

C H A P. XIII.

Of WOUNDS of the FACE.

I. **S**INCE the Face was intended for Beauty as well as for particular Uses, Of Wounds of the Face in general. two Things are to be remarked; to wit, That we do not leave worse Injuries upon the Face, and particularly the Eyes, than we were employed to cure; and that we make an even fair Cicatrix. As the Face consists of various Parts, each of which requires a distinct Method of Treatment, it will be necessary to treat of each of them separately.

II. In almost all Wounds of the Forehead that do not penetrate the Scull, this Of Wounds of the Forehead. is principally to be observed; that after the Wound is cleaned from grumous Blood, and any foreign Bodies that may have got into it, it should be anointed with some vulnerary Balsam, such as the *Balsamum Peruvianum*, *Copaivæ*, or any other of that Kind; the Lips of the Wound are then to be kept together with narrow Slips of sticking Plaster, and over this a vulnerary Plaster is to be laid. Where the Wound is large, these Plasters will not be sufficient to form an even Cicatrix. Therefore to forward this End it will be proper to sprinkle the Wound with *Pulvis Sarcocollæ, vel Pulvis ex Radice Symphyti, Gummi Tragacanth. ac Gummi Arabico præparatus*: You may then apply your Plaster, Compresses, and proper Bandages. The bloody Suture is never to be used either in these or any other Wounds of the Face, where it can be avoided; for the Stiches encrease the Number of Scars. If a Wound of the Forehead is made in a strait Line, the *uniting or incarning Bandage*, described in *Plate II, Lett. f*, will be of great Service in forming a fine Cicatrix: It is to be applied to the Forehead, after the same Manner which we advised it to be applied to the Abdomen in longitudinal Wounds of that Part. See *Chap. V, N. X.* But if the Forehead is wounded transversely, and the Fibres of the frontal Muscle are divided, it occasions a great Deformity; for the Power of lifting up the Eye-brows, and of contracting the Skin of the Forehead, ceases. In this Case, after cleaning the Wound, it is best to unite it with a Stich or two, dressing it with a vulnerary Balsam or Powder, and laying on sticking Plasters, securing all with a proper Bandage, and advising the Patient to keep himself still. It sometimes happens in young healthy Persons, that the divided Fibres of the Muscles join and unite without any Suppuration, where this Method of Dressing is diligently followed. If any great Degree of Hæmorrhage should ensue upon Wounds of this Part, the first Intention is to stop it with dry Lint, Compresses, and a tight Bandage; and at the next Dressing, after it has been well cleaned and washed with warm Wine, its

Lips should be brought together as before with Slips of sticking Plaster; or in transverse Wounds with a Stich or two, if it be necessary.

Of Wounds
of the Eye-
brows.

III. Wounds of the Eye-brows require much the same Treatment with Wounds of the Forehead: Only in Wounds of the Eye-brows more particular Care must be taken to guard against Inflammation, lest the Eyes should partake of the Injury. All sharp Things should be avoided both in Eating and Drinking: And if the Patient is of a plethorick Habit of Body, he should lose Blood in the Arm. The usual Dressings should be covered with Compresses, dipped in camphorated Spirit of Wine. If the Wound is large, and the Eye-brows entirely divided, it will be necessary to use the Suture, and to dress them up with a vulnerary Balsam and Plaster, covering up both Eyes, and keeping them as much as possible from Motion. By neglecting this Method, the Situation of the Eyes in this Case will have a very frightful Effect: And sometimes the Patient is deprived of his Sight.

Of Wounds
of the Eye-
lids.

IV. Wounds of the upper or lower Eye-lid will not readily heal; not so much from the Thinness of the Parts of which they are composed, as from the Quantity of Fluids with which the Eyes are continually moistened. At first therefore it will be best to foment the Eye *cum Decocto quodam ex Chamomillâ, Hyssopo, vel Euphrasiâ confecto*, till the Flux of Blood is stopped, and the Wound well cleaned. When the Wound is transverse, you may stich it up in the Middle with a fine Needle, sprinkling it afterwards with the Powder described at N. II. or anointing it *cum Balsamo Copaivæ, de Mecchâ*, or with any other of the same kind, or with *Oleum Ovorum*, laying over it the *Emplastrum Diapalmæ*, and tying it up so that the Eyes may have very little Power to move. Where the Wound is lengthways you must make several Stiches, and dress it up as before.

Of Wounds
of the Eyes.

V. Wounds of the Eye are attended with more Danger than any other incident to the Face; not only as the Patient is thereby often deprived of that most precious Blessing, the Blessing of Sight, (especially if the *Tunica Cornea* or *Uvea* are wounded, either by themselves, or conjointly together with the neighbouring Parts) but as Death itself is sometimes the Consequence, if the wounding Instrument should pierce the Bones of the Orbit, so as to injure the Brain or its Nerves. If the Eye is wounded, but not so as to let out the vitreous or crystalline Humour, the following Method will be of great Service: The Wound should be anointed two or three Times in a Day with a Feather or fine Rag, well dipped in *Unguentum Alabastrinum, aut Albumen Ovi, aut Mucilag. Sem. Cydon. & Psyllii Aq. Rosar. parat.* and afterwards a small Compress is to be laid on, being well saturated with the following Collyrium. *℞ Albumin. Ovor. N. 2. Aq. Rosar. ℥iiss. Ol. Rosar. 3℥. Camphor. Gr. iii. probè conquassando.* Nuck gives us a Case, where a Man was so wounded in the Eye, that part of the vitreous Humour fell out, nevertheless he cured him without leaving any Disorder in his Sight: His Method of Cure was as follows: He divided the Part of the vitreous Humour that hung out of the Eye from the rest, and then diligently fomented the Eye with a Collyrium, prepared *ex Albumine, Aquâ Rosarum, Bolo Armenâ & Camphorâ probè conquassatis.* *Gumm. Arabic. ℥i. in Aquæ Rosar. ℥i. solut.* is very serviceable in this Case; but if it is attended with any great Degree of Inflammation, which is frequently the Case, it will be proper to cover the small Compress with a larger, dipped in *Spiritu Vini camphorata calido.* The Bowels also should be kept loose for some Days with opening and cooling.

cooling Medicines ; if there is a plethoric Habit, Blood should be drawn from the Neck or Feet ; all warm or sharp Things should be thrown out of the Patient's Diet, and great Care taken to keep him quiet : By observing these Regulations, not only the Eye, but the Sight of it also may be preserved. When the crystalline Humour, or any Part of it sticks in the Orifice of the Wound, it should be pulled out, that it may not bring on Deformity, or worse Mischief upon the Eye.

VI. When the vitreous and crystalline Humours are fallen out of the Eye, not only the Sight, but Figure of the Eye must be entirely destroyed. Therefore at first it should be dressed with Compresses dipped in warm Wine, or Spirit of Wine, and afterwards with some vulnerary Balsam. The Deformity, which the Loss of Substance in the Eye will occasion, may be avoided by the Help of an artificial Glass or Silver Eye. *See Plate VII, Fig. 1.* But we shall treat more largely of this in another Place.

VII. It sometimes happens when only the *Tunica Albuginea* and *Sclerotica* are slightly wounded, the *Cornea* and *Uvea* remaining unhurt, that the Eye recovers itself : And though both the vitreous and crystalline Humours fall out by the Wound ^b, yet they are renewed again by the Benefit of Nature, and the Office of Sight performed as well as before the Injury happened. Dr. SEEGER some time since was so kind as to communicate the History of a Case of this Sort to me, whence it appeared that he had restored Sight to a Woman after she had lost the Humours of her Eye. When we have duly considered this, we shall not altogether reject the Testimonies of BURRHUS and KERKRINGIUS, when they affirm to us, that they have acquired the Art of restoring the Sight after the Humours are entirely fallen out of the Eye. We may now also credit those who ^c affirm, that the Sight may be enjoyed without the Assistance of the crystalline Humour, notwithstanding ^d some have strenuously maintained the contrary.

VIII. Wounds of the Nose are generally cured by the dry Suture ; but where the Wound divides the Cartilage, and penetrates so deep that the Lips of it cannot be kept in contact by the Application of sticking Plasters, the true Suture must be made through the Skin on each Side of the Wound. Though it sounds very unlike Truth that any Part of the Nose should be entirely separated from the rest, and afterwards united to it again by the Assistance of Sutures ; yet BLEGNY affirms, that this has happened. *See Zodiac. Med. Gall. Edit. 1680, pag. 75.* When the nasal Bones are fractured, it is usual to place small Tubes made of Lead or Silver under them for some Time, lest the Passage of the Nose should be stopped by the shooting-out of the new Flesh : You will see these Tubes described at *Plate II, P, Q, R.* Externally you may use some Balsam, or *Essentiâ Mastickis, Succini, vel Myrrhæ*, or some glutinous Powder, such as you have seen directed at *N. II.* The Lips of the Wound should be kept

^a Tract. *De Duct. Oculor. Aquos.* pag. 126, 127—132.

^b CREDAT JUDÆUS.

^c You may find many Instances related of Persons who have enjoyed their Sight after the Loss of the crystalline Humour, in SKENKII *Obs. Med.* HILDANI *Obs.* 26. Cent. I. *Act. Med. Hafn.* Vol. I. *Obs.* 69.

^d See my Treatises on the Cataract, Glaucoma, &c.

in contact with each other by the Help of sticking Plasters, and of a fourheaded Bandage; the Application of which will be explained when we come to treat professedly of Bandages.

Wounds of
the Lips.

IX. Wounds of the Lips are made either with sharp or blunt Instruments, or with Bullets: Wounds of the first Sort, whether they are made lengthways or transverse, are generally to be cured by the dry Suture: The Patient in this Case must diligently avoid both Chewing and Talking, his Diet therefore must be entirely Spoon-meat; if the Wound is very large, it will require the bloody or true Suture. In Wounds of these Parts which are made by blunt Instruments, by Falls, or by Bullets, the shattered Parts should be brought to Digestion, and the Lips of the Wound, after being cleaned, are brought together, either with sticking Plasters, or by the Suture, which is used for the Hair Lip, which we shall describe below.

Wounds of
the Cheeks.

X. Wounds of the Cheeks should be treated after the same Manner, and with the same Circumspection, which we advised for Wounds of the Lips: But if one of STENO's *Salivary Ducts* is wounded in its Passage cross the Cheek from the *parotid* Gland, the constant Discharge of Saliva into the Wound will prevent the Cure, till the Duct is perforated in the internal Part of the Cheek, to make a Passage for the Saliva into the Mouth. This Method of Cure is proposed by CHESLDEN, in his *Anatomy*.

Wounds of
the Ear.

XI. Wounds of the external Ear are easily united by sticking Plasters, unless the Cartilage is entirely divided, and then it will require the Help of the Needle, and the Application of vulnerary Balsams, with proper Compresses and Bandages: When the Ear is wounded in the Neighbourhood of the *Meatus Auditorius*, Care must be taken to prevent the Discharge of Blood and Matter into that Passage, which would do great Mischief to the *Tympanum*; this may be done by filling the internal Ear with Lint or Cotton.

Wounds of
the Tongue.

XII. The Tongue is so well guarded by the Jaw-bones and the Teeth, that it is very rarely the Subject of a Cut or Stab, but it is frequently bit in Fits of the Epilepsy, in violent Falls, and it is sometimes wounded by a Bullet. If the Wound of the Tongue is not very large, it will easily heal by the Application of *Ol. Amygdal. dulc. cum Sacch. Cand. q. s. admist. aut Mel Rosar. cum Ol. Myrrhæ per Deliquium.*

How to cure
large Wounds
of the
Tongue.

XIII. Large Wounds of the Tongue will not unite without the Assistance of the Suture. It is no wonder therefore that Wounds near the Root of the Tongue always leave a Fissure in the Part, since their Situation prohibits the Use of the Needle. To prevent Loss of Speech ensuing upon large Wounds of the Fore-part of the Tongue, the divided Parts should be brought together with the Needle, as soon and as neatly as possible, and afterwards anointed with the Medicines which we prescribed in the last Article, since sticking Plasters will not take Place here. PURMAN affirms, that he made use of Silver Threads in Sutures upon this Part to great Advantage. See his *Surgery*, P. I. Chap. VI. Gun-shot Wounds upon the Tongue are to be dressed with the Medicines which we recommended above at N. XII; for Sutures are of no Service in this Case. The Patient should keep from speaking, and live upon Spoon-meats during the Cure, but more particularly when the Wound is just beginning to unite.

Wounds of
the Palate.

XIV. Wounds of the Palate will heal best if you anoint them with *Mel Rosarum* alone, or with the Addition of a small Quantity of *Balsamum Peruvianum*,
or.

or sometimes *Oleum Myrrhæ per Deliquium*. These Remedies also have great Efficacy in curing all other Wounds of the Mouth.

C H A P. XIV.

Of the principal Wounds of the Head.

I. **W**E observed above, that Wounds of the *Cranium*, the Seat or Castle of the Brain, were to be reckoned under the second Class of Wounds in the Head. These, by way eminence, are alone called *Wounds of the Head*. They are divided into several Distinctions, according to the different Parts that are wounded, and the different Species of Wounds. These we shall treat of in the Order we enumerated them in *Chap. XII*, at N. III. We shall begin with the slightest, which are those Wounds that are inflicted upon the external Coverings of the *Cranium*. Intent of this Chapter.

II. There are several Ways of discovering that the Wound is terminated in the external Parts of the *Cranium*: 1. By the Eye. 2. By the Probe, which should be used very gently here, for fear of bringing on further Mischiefs. 3. By examining the Instrument with which the Blow was given, and by considering the Degree of Force with which it was impelled. And, 4. Lastly, by the Absence of violent Symptoms: For a violent Blow upon the Head will always be attended with Vomitings, Vertigo, Blood will be discharged by the Nose, Ears, and Mouth; and the wounded Person will lose his Speech and Senses. These Disorders will appear sometimes sooner, sometimes later; but always more violent, when the Wound is made by a Fall, or by some blunt Instrument, in which Case the *Cranium* is usually much shattered. The Blood which discharges itself by the Wound, when it is made with a sharp Instrument, will insinuate itself between the common Integuments and the *Cranium*. In Contusions that are made with blunt Instruments sometimes it will lie concealed under the *Cranium*, and by corrupting the *Periosteum* and *Cranium* will bring on Ulcers and Caries of the Bone; frequently it will occasion Fever, Convulsions, and Death. But here it must be observed, that the Symptoms are far from being certain Indications. For some, on receiving a Blow, drop down instantly, lose their Speech and their Senses; yet recover surprisingly: Others, at first, are slightly affected, and afterwards die. Wounds of the external Parts.

III. When the temporal Muscles are wounded at the same Time, the Patient will be attended with grievous Disorders; but more especially when this happens by a Blow or a Fall, or by a Bullet: Not only because these Muscles are necessary for the Offices of dividing the Food, and for forming the Speech; but because they are furnished with considerable Nerves, Tendons, and Arteries, which will partake of the Injury; and lastly, because the *Cranium* is thinnest in this Part. Wounds of the temporal Muscles.

IV. Wounds that are made on the external Parts of the Head by acute Instruments, and not attended with any violent Symptoms, are easily cured by the same Methods which we have before prescribed for other Wounds, *Chap. XIII*, N. II. Only in order to make the proper Applications, it will be necessary in the Cure of Wounds on the external Parts of the Head.

the first Place to shave the Part with a Razor. There will be no Occasion ever to make Sutures upon these Parts, since sticking Plasters will always answer your End. If the Wound be made lengthways on the Integuments of the *Cranium*, after cleaning it well, let the Lips be brought together, and bound with the uniting Bandage. See Chap. XIII, N. II. If the Wound be transverse, some Surgeons advise the bloody Suture without Exception. But I should rather chuse, if possible, to close it with Plasters and Bandages, and heal it like other Wounds: Unless there should be any loose Pieces of Flesh or Skin, or the Aperture be so wide, as not to be united by Plasters; for in these Cases the true Suture must be used. You should always endeavour to be as expeditious as possible in finishing each Dressing: The Medicines are to be applied warm, and the Air kept in a moderate Heat with hot Coals. If there should be any great Degree of Hæmorrhage, which will frequently happen from the Number of Vessels that are liable to be wounded in this Part, it must be stopped with dry Lint, or, where that is unequal to the Task, with the *Alcohol Vini, vel Lupi Crepitu, vel Pulvere quodam astringente*. These Applications should be secured with a tight Bandage. After the Hæmorrhage is stopped, you may dress with *Mel Rosarum*, or some digestive Medicines, till the Wound is well deterged; and then with a vulnerary Balsam, or dry Lint, till it is healed. If the Hæmorrhage be exceeding violent, the Artery must be tied up with a Thread. On the other hand, especially in plethoric Constitutions, we should not be too hasty in stopping the Blood: For the Discharge in this Case proves oft-times beneficial, and prevents many bad Symptoms that might otherwise ensue.

The Use of
medicated
Bags.

V. It has been frequently the Practice among Physicians to order ^a medicated Bags to be applied to the Head, when it has been considerably wounded, to prevent or assuage the Violence of the Symptoms, such as Tumors, Inflammations, and Pain: These Bags are stuffed with *Betonica, Salvia, Majorana, Serpillo, Origano, Rorismarino, Floribus Lavendulae, Salviae, Rosarum, & similibus*; these they boil in Wine, and after having gently pressed them, they apply them, as warm as the Patient can bear them, to the wounded Part. Where the Symptoms are already urgent, they make two Bags, and apply them alternately. By these Means the inspissated stagnating Blood is rendered fluid, and the Mischief is frequently removed without having recourse to the Trepan. When the Symptoms are too violent to be removed by these Applications, we are forced to use other Methods, according to the Nature of the Disorder. Of these we shall treat in the subsequent Articles.

How Contu-
sions are to
be treated.

VI. In violent Contusions of the Head, which will be discovered by the Tumor and Softness of the Part, by the Separation of the Integuments from the *Cranium*, and by the Collection of stagnating Blood which appears to be confined under the Skin; you should endeavour to divide the confined Fluids by attenuating Medicines externally applied, or to discharge them by making an Opening with a Knife; or lastly, to bring them to Suppuration. Where the Extravasation of Fluids is very considerable, it is best to discharge the greatest Part of them instantly by Incisions, and what remains will be easily dispersed. The Application of the medicated Bags, described above, will answer the Intention of

^a This Form is entirely laid aside with us in *England*, and Fomentations made of the same Herbs substituted.

thinning and dividing the stagnated Blood: But you may add to the Ingredients, which we mentioned, *Herba Chamædrys, Scordium, Sabina, Abrotanum, Absinthium, Mentha, Ruta, Flor. Chamomil. Sambuc. Rad. Bryoniæ*, and Things of the like Intention. The Bags that are stuffed with these Ingredients may be quilted, that they may be divided into equal Parcels, and not run together in Lumps. Where Wine cannot be had to boil them in, you may make use of Water, adding a Proportion of Spirits of Wine, or Malt, or Melasses, after it has done boiling, and a few Ounces of Soap. But particularly, a Vein should be opened toward the Beginning of the Disorder, and the Mass of Blood thinned with proper Infusions of diluting Herbs, after the Manner of Tea, with all other attenuating Medicines. We shall treat more largely upon what is farther to be done in this Case, in a following Chapter upon *Contusions*.

VII. Where you find it impracticable to attempt the Attenuation and Division of the stagnating Fluids, it will be proper to attempt the Suppuration of them. In violent Contusions it will be adviseable to prescribe the Application of such Cataplasms as are directed above at *Chap. II, N. XII.* and below at *Chap. XV.* But in flighter Cases, where there is an Opening, the *Unguentum digestivum cum Aloë et Spiritu Vini pauxillo admistum* will do the Business, covering the Part afterwards with a warm Plaster, such as the *Emplastrum de Meliloto, Malæticum, Diachylon simplex vel compositum, vel Empl. de Galbano.* After the Suppuration is formed, and the Matter discharged, the Wound will easily heal by the Application of a vulnerary Balsam. But in violent Contusions, where there is no Opening, or a very small one, by which the Matter cannot be discharged, you must enlarge the Wound with your Knife, to prevent the neighbouring Parts from being corroded. By this Means the Wound will easily be cleaned, and by observing the Directions we have frequently laid down above, the Cure will be speedily performed; and you will easier discover whether the Scull be found or fractured.

VIII. When the *Pericranium* is wounded, but not in so great a Degree as to lay the *Cranium* bare, treat the Wound in the Manner we described above at *N. IV. of this Chapter*; omitting the Use of the vulnerary Oils there prescribed, because they would injure the *Cranium*, and substituting in their Room some warm balsamic Medicines, such as the *Balsamum Peruvianum, Copaivæ, Spir. Terebinth. Essentia Myrrhæ, Succini, Spir. Mastichis*, and others of that Kind. But where the *Cranium* is left bare and exposed to the Air, its internal Lamella, being robbed of its Nourishment, by the Destruction of the Vessels by which it was constantly supplied, will lose its natural Colour, and become yellow, livid, black, and by degrees separate from the neighbouring Parts, and exfoliate, as we term it, which will greatly protract the Cure of the Wound.

IX. To prevent the Corruption of the *Cranium*, and the Separation of its Lamina, and to expedite the Cure, the Surgeon should immediately cover the denudated Part, by drawing over the Skin, if it has not been too long exposed to the Air. He should then dress it with proper Plasters and Sutures: By which Means the Cure is commonly effected without Exfoliation. Even where the Part has changed Colour, it is not always necessary to wait for a Separation of the Lamina; as many are of Opinion it is often sufficient to apply dry Lint to the naked Bone, and dress the Wound with a Digestive: By which Method alone it generally heals. In order to hasten the Exfoliation of the *Cranium*, and forward:

forward the Cure, the Surgeon ought to bore several ^a Holes through the denuded Part, as deep as the *Diploë*, with an Awl, or with Instruments like those described at *Plate VII, N. II. and Fig. 7. Lett. A.* This Operation does not only forward the Exfoliation of the Part, but make way also for the sprouting up of fresh Vessels, and forming as it were a new *Pericranium*. The Dressing, which ought to be performed each Time with Expedition, and not repeated so often as in other Cases, is to be applied in the following Manner. When the Wound is properly cleaned, Pledgits, first dry, afterwards well-saturated with *Essentia Mastickis, Succini*, or any other mild balsamic Medicine, with the Addition of a small Quantity of *Mel Rosarum*, are to be laid upon the injured Part of the *Cranium*: Over these you may clap the *Emplastrum de Betonica*, and over that the Bolsters and Bandage for the Head (*Fr. Couvre chef*) described above at *Plate III, Fig. 1. A.* These Applications should be continued till the *Cranium* appears to be sound, and the Wound is in a Condition to heal. When the *Pericranium* is contused, but not separated from the *Cranium*, you must endeavour to disperse the stagnating Fluids, by the Application of medicated Bags, described at *N. V, VI.* If these have not the desired Effect, you may have recourse to Scarification, and warm Fomentations.

Of Wounds
in the tem-
poral Mus-
cles.

X. If the temporal Muscles are wounded by a cutting Instrument; when the Wound is cleansed, it must be treated in the common Method. Should the Artery suffer, the Hæmorrhage must be stopped either by Pledgits, Compresses and Bandages, or by a Ligament of Thread. If the Wound be made by Puncture or Contusion, you must have recourse to the medicated Bags; and what extravasated Blood lies beneath, should be drawn off, by Incision. When we find that the *Cranium* is fractured under these Muscles, and that there is con- creted Blood under the Fracture, then an Incision may be made in the Muscle lengthways, or obliquely, if it be judged necessary; that the Wound may be cleared of the stagnated Blood and the Fragments of the *Cranium*, if there be any, in order to facilitate its healing.

Of Injuries
of the Cra-
nium.

There are several Ways by which the *Cranium* may be hurt; by Falls, Blows, Cuts, &c. which has occasioned Authors to divide Injuries of this Part into several Distinctions; to wit, into Contusions, Depressions, Fractures, Fissures, and ^b Contra-Fissures, that is, where the Fissure happens on the Side opposite to that which received the Blow.

Diagnostic
Signs.

XI. There are several Circumstances concerned in discovering an Injury of the *Cranium*. In the first Place, you must diligently inspect the wounded Part, and make Enquiry with what Force the Blow was given that occasioned it: After this you may search the Wound with a Probe, but very circumspectly, lest by pushing it rashly forward you should injure the Brain. Some use a Pen in the room of a Probe, when they are searching for Fissures of the *Cranium*, and if the Pen is pointed at the End like a Tooth-pick, it will easily detect any Inequality or Roughness of the Bone: But you must be very careful not to suffer yourself to be deceived, as HIPPOCRATES was, by the Sutures. When Fissures of

^a See HILDAN. *Cent. iv. Obs. 95.* and RUYSEN. *Obs. 5.*

^b Many Writers have denied this Case to be possible; but not only HIPPOCRATES, in his Book *De Vuln. Capit.* but CELSUS, *Lib. viii. C. 4.* and ÆGINETUS, *Lib. vi. C. 90.* have plainly described this Case; but amongst the Moderns D. WAGNER, in a Treatise *De Contra-fissurâ*, and LE MAIRE, *De Rescinitu*, have put this Matter out of all doubt.

the *Cranium* are so very fine, that they escape the Eye, and the Touch of the Probe, though the Violence of the Symptoms sufficiently declare that the Patient has received an Injury of this Kind, it will be necessary to lay the Bone bare, and to drop Ink upon the Part of it which you suspect, and wipe it off again immediately with Lint: And if any Part of it is fissured, you will find a black Stroke remain, notwithstanding your Endeavour to wipe the Bone clean. If you are still at a Loss, put a Key into your Patient's Mouth, and bid him bite hard upon it. If this occasions a Stridor of the Teeth, and Pain, Surgeons are apt to determine that there is a Fracture or Fissure in the *Cranium*. Where the Bone has lost its natural Colour, they will not allow it to be whole. The most certain Signs of a fractured *Cranium* are the violent Symptoms that immediately succeed the Injury: Such as vehement Pains, Vomitings, Vertigo, and Noise in the Ears; yet these are not always to be depended on: If Blood at the same time is discharged from the Nose or Ears, the Senses and Reason entirely lost, and the Patient is continually sleeping, the Matter is out of all doubt. In a few Days after the Wound is received you will have a small Discharge of thin fetid Matter: About the seventh Day the Integuments separate from the Bone, and the *Cranium* itself is sometimes so very foul, that it lets the Matter through to the Membranes of the Brain, which presently partake of the Disorder, and occasion acute Pains, Spasms, Drowsiness, Loss of Motion, or Rigor of the Limbs, Loss of Speech, Apoplexy, and at length Death. All these Mischiefs may arise from a very small Fissure of the Scull, Examples of which you will find very frequent amongst the Writers in Surgery.

XII. This ought to teach us to be very cautious in delivering our Opinions Prognostic. concerning the Event of Wounds in the Head; for we can never promise a Cure, though the Wound should at first appear to be very slight. On the other hand, many who labour at first under violent Symptoms, by Bleeding and proper Remedies have been known to recover beyond Expectation. I shall here lay down some Observations which are well worthy of a Surgeon's Attention: It is very difficult to cure a Man who is poxed, or of a scorbutic Habit, at the Time he receives a Fissure in the *Cranium*. When the temporal Bone is the Subject of the Injury, the Cure is very doubtful. There remain very little Hopes of Recovery where the *Cranium* appears black. They also are in extreme Danger who have a black dry Tongue, full of Clefts, and beset with Pustules, or are attended with a Diarrhœa or Dysentery, or where the Water is either quite clear and white, or as turbid as the Urine of Cattle.

XIII. The first Question to be asked, when you come to examine a Wound How Inju-
ries of the
Cranium are
to be treated. of the Head, is, whether it was made with a sharp or a blunt Instrument? If the Wound was made with a sharp Instrument, and penetrates into the *Cranium*, it must be filled at the first Dressing with dry Lint, in order to stop the Blood; but in the following Dressings, after the Matter is well wiped away, you may apply the *Essentia Succini, Mastichis, Myrrhæ, cum admixto Rosarum Melle*. These Dressings are to be repeated as long as the Condition of the Wound shall require it. See above, N. IV. Where the *Cranium* is very much shattered by the Blow, and the Brain wounded, this Case is attended with very great Danger, but requires the same Method of Treatment with the former, only greater Diligence must be observed in cleansing this Wound, and the more Expedition in applying the Dressings, to keep it from the Injuries of the Air. If the *Cranium*

is so perforated by a cutting Wound, that it cannot well be cleansed from the Blood or Splinters; or by a Puncture, that brings on any dangerous Symptoms, the Trepan must be applied. If a Piece, quite broke off from the *Cranium*, yet sticks to the Integuments; that Piece, after cleansing the Wound, should be restored to its Place, the Skin stiched together, and the Wound properly dressed. This Method generally succeeds.

Wounds of
the Head
with a blunt
Instrument.

XIV. When a blunt Instrument is the Occasion of an Injury upon the *Cranium*, if the injured Part does not sufficiently appear of itself, we ought to use great Industry to discover it.

How the
Wound is to
be examined.

XV. You will easily discover the injured Part, if you divide the common Integuments to the Bone, where they appear tumid and soft: In making your Incision you should take great Care not to lay too much Stress upon your Knife, lest you should force Splinters of the fractured *Cranium* into the Substance of the Brain.

How the In-
cision is to
be made.

XVI. If you find it necessary to make an Incision through the Integuments, it may be made in a right Line; but where that is not sufficient, let it be formed like the Letter X, about an Inch and an half in Length, lifting up the Skin at each Angle, and leaving the Bone bare. The Blood which is spilt may be taken up with a Sponge, and dry Lint stuffed between the Skin and the *Cranium*. Having found out the injured Part of the *Cranium*, you may now apply the *Trepan* if you shall think it necessary. Some Surgeons in scalp- ing prefer the Figure of the *Roman* Letter V, or the *Greek* Λ ; others prefer a longitudinal Incision. In Wounds which are made near the Temples, great Care must be taken not to divide the muscular Fibres. There are Surgeons who contend much for an Incision in the Form of a T. But the Situation of the Wound will always determine you with regard to the Figure of the Incision which you shall make, either for the Discovery of a Fissure, or to prevent or remove bad Symptoms.

What is to
be done after
Scalping.

XVII. Having discovered the injured Part of the *Cranium*, and cleared away the grumous Blood and Matter with a Sponge, you are next to remove any Splinters of Bone that may come in your way, with your Fingers or the Forceps: Where they hang to the *Pericranium*, you must use the Scissors: Where they adhere pretty firmly to the neighbouring Parts of the *Cranium*, it is more adviseable to replace them, than to endeavour to remove them by Violence. But if there are no Splinters or Fragments of Bones, and the *Pericranium* is bruised, inflamed, or bloody, you should then scarify the Part, and proceed as above at N. VIII.

How a Con-
tusion is to
be treated.

XVIII. But if the *Pericranium* is quite corrupted and separated, cover the Bone with dry Lint; or bore several small Holes through the external Lamella of the Bone, till you find Blood proceed from the wounded *Diploë*: After this you may dress the Part up with balsamic Medicines, (N. IX.) If upon repeating the Dressings you discover fresh, yellow, or black Spots, the Parts so discoloured are to undergo the same Operation. This is the easiest and most expeditious Way of remedying this Disorder.

How Fissures
are to be
treated.

XIX. When you discover a Fissure in the *Cranium*, attended with no other bad Symptoms, but white, yellow, or brown Spots upon the Face of the Bone, you will find it sufficient to bore down to the *Diploë*, and dress it with warm balsamic Medicines: In the mean time Bleeding and Diluters must not be omitted.

ted. There is not always Occasion for *Trepanning* in Fissures, as many besides HIPPOCRATES have declared. But where any violent Symptoms come on, which demonstrate an Extravasation of Blood in the Cavity of the *Cranium*, which cannot be evacuated or dispersed by the Methods abovementioned, the *Trepan* is to be called for without Delay.

XX. The Surgeons amongst the Antients used another Method for the Cure of Fissures of the *Cranium*, that were not attended with very bad Symptoms. Their Method was to scrape away the upper Table of the Bone, 'till they came down to the *Diploë*: For this Purpose they used *Rugines*, or *rasping Chissels*, of different Shapes, semi-circular, plain, or acuminate, as you may see in *Plate VII, Fig. 3, 4, 5*. This Practice is still continued by some; but the Method of boring is far less troublesome, and therefore justly preferred to it.

The Method used by the Antients in this Case.

Of DEPRESSIONS of the CRANIUM.

XXI. The Skull in Infants and Children is sometimes depressed or dented in by a Blow, like Tin or Copper, without any manifest Fracture; or at least fractured in such a Manner, that from its Flexibility it does not start out, but still adheres firmly to the neighbouring Bones. But in Adults this Case cannot happen; for the Bones in them are become so rigid, that it is impossible to beat in any Part of the *Cranium* without breaking the Bone to Pieces. These Injuries of the *Cranium* are called by the Surgeons *Fractures* or *Depressions*: The Brain is frequently injured by these Accidents, and the Actions of it disturbed.

Of Depressions of the *Cranium*.

XXII. These Accidents are attended with full as bad Consequences as those we have already described. According to the Degree of Depression, so is it attended with more or less Danger. Sometimes it is quite incurable: For in this Case the Vessels of the Brain are very liable to be injured, which frequently produces such an Extravasation of Blood in those Parts, as must necessarily bring on grievous Disorders, and frequently Death itself.

Disorders occasioned by it.

XXIII. You may easily discover a *Fracture* or *Depression* of the CRANIUM; A Fracture in the *Cranium* is easily discovered.

1. By your Eye.
2. By the Touch.
3. By considering the Cause of the Injury.
4. By the Symptoms that succeed it; though these alone are very uncertain.

Depressions and Fractures of the *Cranium* are by no Means so difficult to discover as Fissures. That Fractures of the Skull are attended with great Danger, and frequently with Death, nobody will deny, who considers well the Structure of the neighbouring Parts.

XXIV. The first Thing to be done towards relieving this Disorder, is to lift up any Part of the Bone that is depressed, or beat in upon the Brain, and replace it, if it still adheres to the neighbouring Bones; or to remove any other Body by which that Part is compressed. Sometimes a Splinter, which is quite separated from the rest of the Bone, is driven into the Cavity of the *Cranium*, and lies constantly vellicating the Brain and its Membranes with its pointed Parts. This is to be removed without delay, yet very tenderly, and with the Caution we recommended, N. XVIII.

How it is to be treated.

XXV. When slight Depressions are made in the Skulls of Infants, without bringing on any bad Symptoms, you must not use the forcible Methods of raising the depressed Part, which we directed above; but call those Medicines

How slight Depressions in Infants are to be treated.

into Use which we advised for the Cure of Contusions, such as the medicated Bags boiled in Wine, or Spirit of Wine camphorated; or, lastly, apply a Plaster to the Part, such as the *Emplastrum de Meliloto, sive de Betonicâ*. Nor must you omit internal attenuating Medicines, N. V. These Applications frequently cure slight Impressions, and prevent the mischievous Consequences which might be expected from them.

How a larger
Depression is
to be treated.

XXVI. But where a greater Degree of Depression happens to Infants, the Elevation or Restitution of the Parts is performed in the following Manner. After shaving the injured Part, they apply a Plaster made of very sticky and gummy Materials, spread upon a strong Piece of Leather, to the Middle of which a Cord is fastened. This Plaster is laid on pretty warm, and left in its Situation till it is grown cold: The Surgeon then taking hold of the Cord that is fastened to it, pulls the Plaster directly upwards, and with it the depressed Part of the *Cranium*. See Plate VII, Fig. 6. If this does not succeed at the first Trial, it is to be repeated. The Application of the Cupping-glass to the depressed Part will sometimes succeed, especially if you stop the Patient's Breath at the Nose and Mouth during the Operation. But if neither the Plaster nor Cupping prove of any Service, it will be necessary to call for the Assistance of an Instrument like an Awger; such an one as you see described at Plate VII, Fig. 7. Lett. B; which is to be applied after the common Integuments and *Periosteum* are removed. ROHAULT rejects both the Cupping-glass and Awger, and advises the *Trepan* in their stead, where the Symptoms are bad. See his Treatise above cited, p. 53.

How a fractured *Cranium* is to be treated.

XXVII. But when the *Cranium* is so depressed, whether in Adults or Infants, as to suffer a Fracture, or Division of its Parts, it must instantly be relieved. The Part depressed, which adheres, after cleansing the Wound, must be restored to its Place; what is separated must be removed, and the extravasated Blood be drawn off through the Aperture. Some are very high in their Commendations of a sternutatory Powder for this Purpose, asserting that the Distention of the Brain is so violent in the Act of Sneezing, that it will restore the depressed Parts of the Bone to their former Situation; but the ill Consequences that may attend this Practice are so grievous, that in my Opinion it ought to be rejected. You will find the Elevatories described at Plate VII, Fig. 7. Lett. C, and at Fig. 8. very serviceable, if there is a small Foramen to which the Instrument can be fastened. But if there is no Hole already in the Part, you must apply the screw End of the Instrument at Fig. 7. Lett. B, or one of that Kind, by which Application the depressed Part may be restored. In the mean time an Incision ought always to be made through the common Integuments, that they may be drawn back for the Instrument to take place, N. XV. and a Foramen should be made with a sharp-pointed Instrument, (Fig. 7 or 2. Lett. A) to admit of the End of the *Trepan*.

A particular
Kind of Ele-
vatory with
three Feet.

XXVIII. But as the Elevatories at Fig. 7 and 8. are so contrived, that where the neighbouring Bones are depressed or fractured, these Instruments cannot be applied without Danger of encreasing the Complaint, it appeared necessary to the Surgeons amongst the Antients to invent another Instrument for this Purpose, which might be applied with more Safety; this they called, from the Number of its Feet, *Tripes*, Tab. VII, Fig. 12. It is near twice as big as the Figure we have given you. The Feet AAA may be placed at farther

ther Distances, or brought nearer to each other, as you shall see occasion: The Manner of applying it is this. The Feet of this Instrument are applied to the sound Parts of the Head; and the Screw B, C, by frequently turning round its Handle D D, will presently lay hold of the depressed Part of the *Cranium*, especially if you have before-hand made a small Hole in the Middle of it with the Awl at *Fig. 2*. Upon turning the Screw, E E, the *Trepan* is raised by Degrees, and with it the depressed Part of the *Cranium*. You will conceive this more clearly by examining *Plate VII, Fig. 13*. But if any Opening shall appear between the fractured Parts of the *Cranium*, it will be better to take off the pointed End of the Instrument, and in its room fix the Elevatory G, by the Screw H, about the Part at Letter F of *Fig. 12*. and by the Assistance of this the depressed Part may be raised, as we taught above.

XXIX. HILDANUS describes an Instrument for this Intention, which is a much simpler Instrument than that which we have just shewn you, and a very convenient one for the Purpose, See FAB. HILDAN. *Cent. II. Obs. 4*. We have given you a Description of this Instrument in *Plate VII, at Fig. 14*. You should be provided with the Awger A, and the Hook at *Fig. 15*; through either of which, according as you shall see necessary, the Lever B C may be passed, after the Instrument is fixed upon the depressed Part of the *Cranium*. The Plate D is to be placed upon the sound Part of the Head, laying Bolsters under it to prevent Pain: Then by raising the End of the Lever at B, the depressed Part of the *Cranium* will be gently elevated and restored to its natural Situation. You will observe a Joint at the Extremity of the Lever C, to accommodate the Plate D to the Convexity of the Head in some Parts of it, which may be also raised or depressed by the Screw E. If you please, you may make the Lever longer than it is represented here, which will add to its Force. PETIT has described a new Kind of Lever^a; which I have given you the Figure of, *Plate XXXIX*. as it may sometimes be of Service.

XXX. But if any Part of the Bone is entirely separated from the rest, and driven so deep into the Cavity of the *Cranium*, that it cannot be elevated or extracted by the Methods which we have already opposed, you must perforate the neighbouring sound Part with a *Trepan*, and divide the intervening Part with a fine Saw, *Fig. 9*. as deep as you shall think you can with Safety. After this you may cut it entirely through with the Chissel and Leaden Mallet at *Fig. 10, and 11*. Having made an Opening in this Manner, you will have a full command of any Splinters or foreign Bodies that are driven into the *Cranium*, and will more easily evacuate the extravasated Blood. Cases that require this last Method of operating are very rare, but they are no less necessary, though the Operation requires great Pains and Dexterity in the Performance of it.

XXXI. Having raised up the depressed Parts of the *Cranium*, and restored them to their natural Situation, you must take great Care to secure them from a fresh Depression; the Patient should lie on the sound Side of his Head, the fractured or depressed Part should be guarded with a Brass or Steel Plate, and the wounded Part should be treated according to the Rules which we have already laid down.

^a *Memoires de Chirurgie, Tom. i. p. 302.*

EXPLANATION of the SEVENTH PLATE.

Fig. 1. An artificial Eye made of Glass or Silver, painted after the Life; this may be introduced into the Orbit, and supply the Place of the natural Eye, and prevent the Deformity that will ensue upon the entire loss of that Organ.

Fig. 2. An Awl, or sharp Instrument to perforate the external Table of the Cranium.

Fig. 3, 4, 5. Different Forms of Rugines, or rasping Chisels, to scrape the Cranium, or other Bones.

Fig. 6. Shews how the Depression of the Cranium in an infantile State may be relieved by sticking Plasters.

Fig. 7. A, a quadrangular, or pointed Steel Instrument, to perforate the external Table of the Cranium. B, an Awger. C, an Elevator to raise depressed Bones of the Cranium.

Fig. 8. Another Elevator for the same Uses with the former.

Fig. 9. A small fine Saw; and *Fig. 10.* a small Rugine, which may be used with or without the Handle described to that at *Fig. 3.*

Fig. 11. A wooden Mallet, the Head of which is filled with Lead.

Fig. 12. An Elevator with three Feet. See above, N. XXVIII.

Fig. 13. Describes the Method of applying this Instrument.

Fig. 14. HILDANUS's Elevator. See above, N. XXIX.

Fig. 15. A Hook belonging to HILDANUS's Elevator.

How extravasated Blood is to be discharged from the CRANIUM.

Disorders occasioned by Extravasation of Blood.

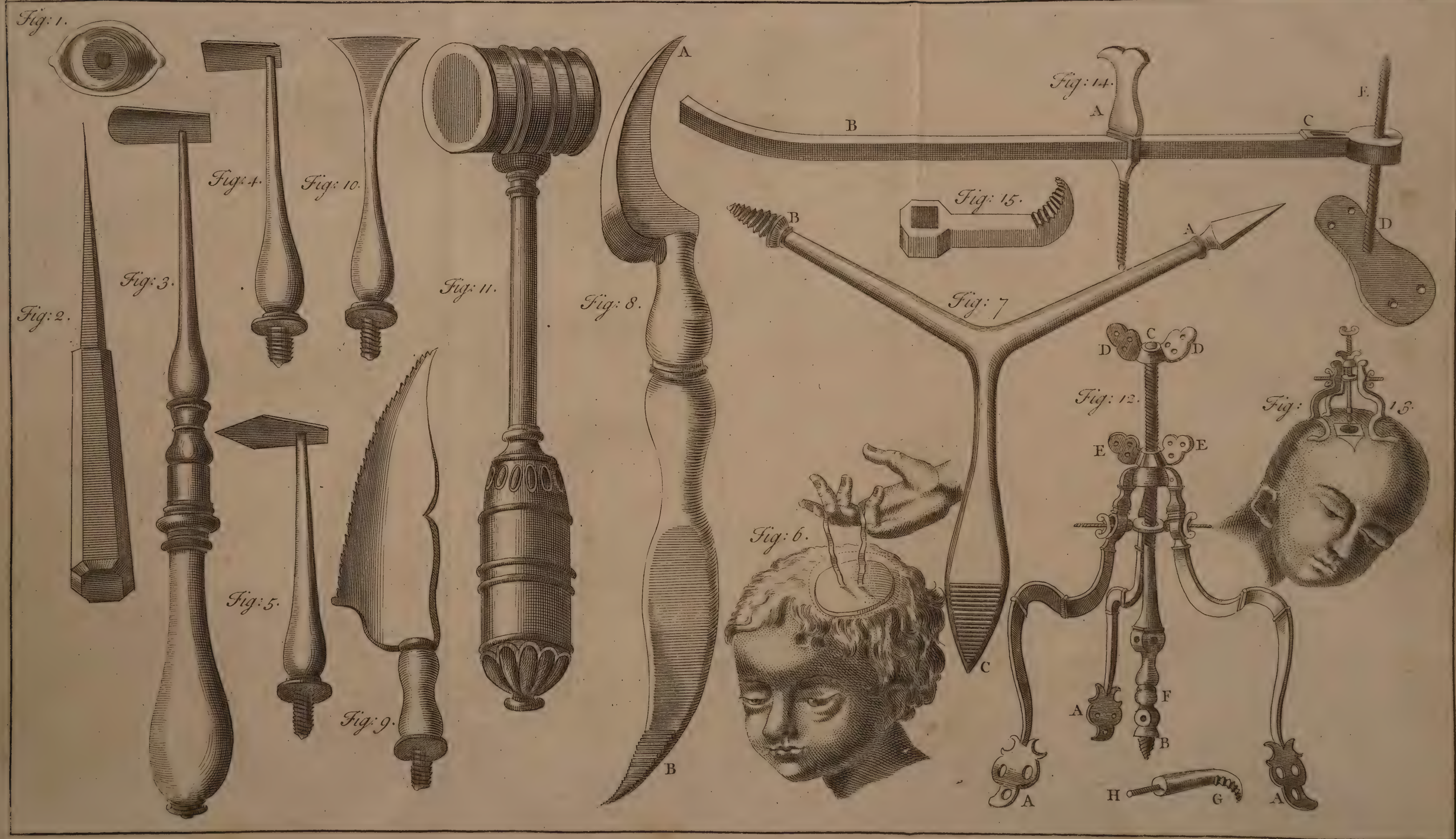
XXXII. In the Injuries of the Cranium that we have been describing, that is, in Contusions, Fissures, Depressions, and Fractures, one or more of the Blood-vessels that are distributed upon the *Dura Mater* is frequently divided. The Blood that is discharged by this Accident greatly oppresses the Brain, and disturbs its Offices; this frequently brings on violent Pains, Deprivation of Senses, and other Mischiefs, and at length Death itself, unless the Patient be timely relieved. If the Quantity of extravasated Blood be ever so small, it will certainly corrupt, and affect the *Meninges* and the Brain itself with the same Disorder; from hence will proceed violent Inflammation, Delirium, Ulcers, and what not? even Death itself, sooner or later. And this will frequently be the Case after a violent Blow upon the Cranium, when a Vein or Artery is wounded, though the Bone should escape without any Injury.

Where the Blood is spilt.

XXXIII. In these Injuries of the Head, the Blood is spilt either between the Cranium and *Dura Mater*, or between the *Dura* and *Pia Mater*, or between the *Pia Mater* and the Brain; or lastly, into the *Sinuses of the Brain*. Each of these Cases are attended with great Danger, but the deeper the Extravasation happens, and the more copious the Discharge, so much the greater will the Danger be.

How to discover an Extravasation of Blood in the Cranium.

XXXIV. You may suspect that Blood is extravasated in the Cavity of the Cranium from the Violence of the Symptoms which succeed: If the Patient lies





still without Sense or Motion ; if Blood flows from the Mouth, Ears, or Nose ; if the Eyes are much inflamed and swelled ; if Vomiting succeeds ; when upon the Remission of these Symptoms the Patient complains of a remarkable Heaviness of Head, a Sleepiness, Vertigo, Blindness, Spasms, and Disorders of this Kind. When the Quantity of extravasated Blood is very considerable, and oppresses the *Cerebellum*, the Patient dies upon the Spot : But when the Extravasation is not in a very large Quantity, or at least does not affect the *Cerebellum*, Life still remains, but the Symptoms related above come on. Sometimes these Symptoms come on very slowly ; and great Numbers of Persons, who have appeared at first to have been but slightly wounded, have died in this Manner, after some Time, contrary to all Expectation. Therefore I cannot help again admonishing the Surgeon, that after violent Blows of the Head, though no violent Symptoms should immediately urge, yet he should be very cautious in delivering his Prognostic, and not be too hasty in his Opinion ; nor, by treating the Case as slight and indifferent, endanger the Life of his Patient. But when violent Symptoms immediately ensue, you may always be sure that there is an Extravasation of Blood, though no great Injury appears upon the external Part of the Head.

XXXV. If you can find no Fracture, Fissure, or Contra-fissure, in the *Cranium*, nor even any external Injury upon the Integuments of the Head after a violent Blow, and the Patient is deprived of his Senses, you will find it difficult to determine in what Part of the Head an Extravasation is seated. It will be proper therefore, 1. To shave the Head all over, that you may be the better able to examine it. For if any Part is softer than ordinary, or enlarged, or red from a Stagnation of Blood, it is plain that this is the Part which received the Injury. You may also examine Persons who were present at the Accident, from whom you may frequently get Light into the Affair. But, if you are still left in the Dark, 2. Cover the whole Head, after it is close shaved, with an emollient Plaster, laying over it medicated Bags well heated : This Application will, in a few Hours, produce Tumor and Softness upon the injured Part. 3. Sometimes the Patient, though he lies speechless, and to all Appearance senseless, will be continually clapping his Hand to the aggrieved Part. 4. If either Side of the Patient has lost Sense and Motion, and is become paralytic, it is an apparent Sign, whatever some may think to the contrary, that the Injury was received on the contrary, or sound Side. See MORGAGNI *Adversaria Anatomica* VI. et *Dissert. de Resonitu*, Argentorat. 1722. Edit. Pag. 23. If you discover any Wound in the Skin, you should enlarge it with the Knife, till you come at the Injury in the *Cranium*, whether Depression, Fissure, Contra-fissure, or Fracture.

How to discover the Part in which the Blood is extravasated, though there appears no external Wound.

XXXVI. When you have discovered the Seat of the Injury, the first Intention is to discharge the extravasated Blood, which must otherwise endanger the Patient's Life ; and then to clean the Wound, and remove all Splinters or extraneous Bodies. Many Writers in Surgery advise the instant Use of the Trepan, to make way for a Discharge of the extravasated Blood ; but since this is a difficult and dangerous Operation, and many have recovered without having Recourse to it, I see no Reason for attempting it, unless we are driven to it by absolute Necessity. Therefore I think it is best to try first the Force of attenuating and dividing Medicines in this Case.

How the injured Part is to be treated.

XXXVII. With

How inspissated Blood should be attenuated.

XXXVII. With this Intention, 1. Open a Vein, and draw away as much Blood as the Strength of your Patient will admit: This will take off the Impetus of the Vessels, and prevent the Extravasation of more Blood. 2. Prescribe a pretty brisk Purge, to lessen the Quantity of Fluids, for which Purpose you may also give sharp Clysters. 3. Foment the Head with medicated Bags, and apply a Melilot Plaster to it. 4. Endeavour to rouse the Patient by volatile Applications to his Nostrils, such as *Sol volatile oleosum*, *Spiritus Salis Ammoniaci*, *vel Spiritus Cornu Cervi per se*. Lastly, 5. Give frequently attenuating Fluids warm, such as Infusions prepared *ex Theâ*, *Betonicâ*, *Salviâ*, *Rorismarino*, *Lavendulæ Floribus*, *Ligno Sassafras*, and the like. This Method will contribute greatly to the thinning and diluting the Blood.

XXXVIII. Yet this does not immediately procure the desired Effect, therefore it must be continued for some Time, and the Prescriptions frequently repeated: And more particularly when the Symptoms seem by degrees to abate. The Repetition of Bleeding in this Case may seem strange to some, but it must be to those who are ignorant of the good Effects it produces by lessening the Quantity of Fluids, and by restoring the Course of the stagnating Blood. If the Patient finds a little Relief from the first Bleeding, it will be proper to repeat the Operation a second and a third Time, especially if he is young and athletic, and to apply the Remedies which we have recommended above in the Intervals, till the Disorder is entirely removed.

Sometimes the Trepan is necessary.

XXXIX. But when you find, notwithstanding these Applications, that the Symptoms rather encrease than abate, you will be obliged to make a Perforation in the *Cranium* with the *Trepan*, near the Seat of the Wound, that there may be a Passage for the Discharge of the confined grumous Blood. But there should be great Caution always used in this Operation. If the extravasated Blood or Matter be collected under the *Dura* or even the *Pia Mater*, an Incision must be made in these Membranes, without reserve; that the Enemy may be removed: The Wound is then to be cleansed, and afterwards healed by proper Applications. When you cannot discover the Part of the Head which is principally affected, and the Symptoms are still as violent, or rather aggravated, you must perforate the Skull in several Places, till you hit upon the right. For, if this Method does not always produce the Effect desired; yet, with CELSUS, it is far better to try a doubtful Remedy, than none at all. I shall teach the Manner of performing this Operation, and the Methods of healing the Wound, in another Part of this Work, which treats professedly of *Chirurgical Operations*.

Principal Writers on Wounds of the Head.

XL. If you desire to see Histories of Cures of Wounds of the Head, consult HIPPOCRATES, *De capitis Vulneribus*, cum ARANTII & PAAWII *Commentariis*, and CELSUS on the same Subject. Add to these, BERENGARIUS *De Fracturâ Cranii*, ARCÆUS *de Vulneribus*, SCULTETUS in *Observationibus*, I ad 23. HILDANI *Observationes variæ*, TULP. *Obs. L. i. C. 14*. SCHULTZIUS, *De Capite læso*, BELLOSTIUS in *Chirurgo Nosocom*. WOYTIUS and WALTHERUS *De capitis Vulneribus*, and several others: But particularly amongst the modern Writers, ROHAULT's Book on Wounds of the Head, called *Traité des Playes de Tête*, 4to, 1720, and LE DRAN, in his *Chirurgical Observations*.

CHAP. XV.

Of CONTUSIONS.

I. **A** CONTUSION is any Hurt of the Body that is inflicted by a blunt Instrument: And since in this Case an infinite Number of small Vessels and Fibres are injured and broken, a Contusion may properly be said to be a Congeries of an infinite Number of exceeding small Wounds. It is well enough called by the GREEK PHYSICIANS *Ecchymosis*, and by CELSUS *Vulnus Collisum*, *Lib. V. Cap. 26.* A Contusion what.

II. Contusions may be distinguished into several Sorts; 1. Some may be called *simple Contusions*, that is, when only the soft external Parts are injured: Some are *compound*, when the internal or bony Parts also partake of the Injury. 2. So some Contusions are slight, some of great Consequence; others prove mortal, and in some Cases immediately. This depends upon the Cause of the Injury, and the Nature of the Part injured. 3. Lastly, some Contusions are so circumstanced, which is very wonderful, that the internal Parts should be violently affected, whilst the external Parts remain whole and unhurt; for we are experimentally taught, that a Man may receive a Blow with a blunt Weapon, or even with a naked Hand, upon the Head, Breast, or Belly, which shall occasion instant Death, though there shall appear no external Signs of Injury. See BOHNIUS *De Vulner. Lethal. Sect. I. Cap. I.* Differences.

III. Contusions are usually occasioned, 1. By violent Blows given with blunt Weapons, such as Staves, Bludgeons, or Stones, or a Bullet almost spent. 2. The same will happen from a Fall upon the Stones, or any other hard Body. 3. Contusions are occasioned by the Body being pressed between two Doors, by Presses, Screws, Mills, Wheels, and such like Machines: For, by Accidents of this Kind the Vessels are either entirely broken, or the Blood is violently squeezed out of them, Causes of Contusions.

IV. When the small Vessels and Fibres have been broken by a Contusion, the Fluids that were contained in them will be forced out: Hence will proceed Obstructions, Corruption, Inflammation, and Ulcers, or even Gangrene, and several other fatal Mischiefs, in Proportion to the Violence of the Cause, and the Nature of the affected Part. When the external Parts are contused, the Skin at the same Time remaining whole, the Blood will stagnate under it, and occasion red, black, and livid Spots, which we call a *Sugillation*: From whence arise several other Mischiefs; and if this happens near a Bone, a Caries, or a Fracture. What succeeds a Contusion of the soft Parts.

V. When a bony Part is the Subject of a Contusion, then, 1. The same Mischiefs will ensue from the Injury inflicted upon the *Periosteum*, which we have already described as happening to the *Pericranium* in Wounds of the Head. But when this Disorder, 2. Is accompanied with a Fracture, the same Mischiefs will ensue, which usually attend fractured Bones, and these always increase in Proportion to the Force of the Blow; on which Account the Contusions from Bullets, &c. are generally attended with the worst Consequences. If the Injury is in the Bones of the *Cranium*, the *Thorax*, or the *Vertebra*, you may expect all the Mischiefs, of which we have largely spoken above in the preceding Chapters. Lastly, 3. When the medullary Juice of the Bones is affected, you Of the Bones.

may expect every violent Disorder, whether the Bones are fractured or not. For the Blood which is discharged out of the Vessels that are sent to the *Medulla*, will presently corrupt and produce a Gangrene; or, by corroding the Bones, bring on a Caries, Ulcers, and incurable Fistulæ; which will make it necessary to take off the Limb to save the Life of the Patient: For the medullary Juice is in the same Condition in these Cases with the Brain in Fractures or Contusions of the *Cranium*.

Of the Joints
and Muscles.

VI. Contusions of the Joints usually bring on violent Pains and Inflammations, Convulsions, Gangrene, Sphacelus, Rigidity of the Limbs, and Caries. The same will sometimes happen from Contusions of the muscular Parts. When the internal Parts are contused, great Mischiefs usually ensue, but that depends entirely upon the Nature of the injured Part, and the Degree of the Injury: Sometimes Inflammations, Rupture of the Vessels, Varices, Aneurisms, Hæmorrhages, Stagnation of the Fluids, Corruption, Gangrene, Suppuration: And sometimes, as a necessary attendant upon these, Death. When the Head receives a considerable Contusion, the Senses are then taken away, the Limbs become either convulsed or rigid, and Death presently follows, in the Manner we have already explained, treating upon Wounds of the Head. If a violent Contusion falls upon the Thorax, a Difficulty of Breathing follows, with spitting of Blood, fainting Fits, Inflammation, and Ulcers of the Lungs, which usher in Death. After Contusions of the Abdomen you may expect vomiting of Blood, Inflammations, Suppurations, or Gangrene of the Viscera, and at length Death^a. If any internal Vessel is burst by the Violence of a Blow, it is no Wonder if the Patient dies upon the Spot, though there be no Mark of Violence left upon the external Parts. Lastly, if the Eye is contused, Tumor and Inflammation will succeed, and frequently Loss of Sight.

How to discover the
bruised Parts.

VII. Contusions may be examined, 1. By the Eye, when they are inflicted upon the external Parts of the Body: Tumors are formed, the injured Parts are discoloured, at first becoming red or black, then livid, yellow, green, and at last black again. If the Contusion is not very considerable, the Parts will of themselves recover their natural Colour. 2. When the Contusion is not within the Reach of the Eye, you must feel for it: An unnatural Softness of the Limb, or a Fluctuation of the extravasated Blood under your Fingers, will pretty clearly point out the injured Part to you. 3. Pains and Rigidity of the contused Part will make the same Discovery. Lastly, 4. You may form some Judgment of the Degree of the Injury received, from considering the Manner in which it was given, and the Size and Nature of the inflicting Instrument. You will judge what internal Parts are injured by the Symptoms which succeed, and by observing which of the Functions of the Body are disturbed or destroyed. If a Fracture attend the Contusion, it will easily be discovered by the Eye, the Touch, and the Ear.

^a An Instance of this Kind happened in the Year 1726, at a Village near *Helmstadt*; a School Master there beat one of the Children very smartly, with a Stick of no great Size, but the Boy died in a few Days afterwards; upon opening him, the Viscera of the Abdomen appeared grievously bruised and lacerated. I opened another Boy soon afterwards, who was killed by a Blow, and found his Liver divided quite through the Middle, though there appeared no external Injury. Consult here the Quotation from *BOHN*, in the preceding Page. In the Year 1738, a Boy's Spleen was torn by the Kick of a Horse, and the Cavity of the Belly found full of Blood.

VIII. What we have said above concerning the Nature and necessary Effects Prognosis. of Contusions of each particular Part, will give the Surgeon great light in forming his Prognostic: Nevertheless, it will not be improper to subjoin a Rule or two in this Place. Slight Contusions are attended with little or no Inconvenience or Danger, besides discolouring the Skin: And even that Deformity is of a very short Date; for the stagnating Blood is presently licked up again, and the Spots vanish. But in larger Contusions, where there is a great Collection of stagnating Blood in the muscular Parts, an Abscess, Gangrene, or Sphacelus will easily follow. Contusions of the internal Parts are extremely dangerous; and the Degree of Danger increases in Proportion to the Violence of the Contusion, and the Consequence of the Part in performing the necessary Offices of Life. If instant Death does not happen in this Case, yet it is usually attended with such dangerous Inflammations, that the Patient consumes away by Degrees, and very rarely escapes. Contusions of the Bones, particularly of their *Medulla*, and of the Joints or Ligaments, are very dangerous, especially those which are inflicted by Gun-shot: But the Contusion or Fracture of the *Cranium* from the Vicinity of the Brain, and of the Bones of the Thorax from their near Relation to the Heart and Lungs, exceeds the rest in the mischievous Consequences which attend it, as we have largely enough explained above.

IX. Your principal Care in the Cure of Contusions ought to be to divide the inspissated Fluids, and at the same Time to prevent the Parts from suppurating, and being affected with Gangrene. There are several Methods successfully used for the Cure of slight Contusions. For Example, when a Tumor arises in the Forehead from a Fall, which very frequently happens to Children, it will easily be cured by fomenting it *cum Vino calido, Spiritu Vini vel solo, vel camphorato, Aquâ Reginae Hungariæ*; or by applying cold Water or Vinegar mixed with Salt to the Part; or by clapping a broad Piece of Money, or a Plate of milled Lead upon the Tumor, and fastening it on with a very tight Bandage. Persons of slender Circumstances may find easier and cheaper Remedies; nor will they be baulked in their Expectations, if they apply Linen Rags dipped in fresh warm Urine to Tumors of this Kind. Cure of slight Contusions.

X. Larger Contusions may be dressed with Decoctions *ex Scordio, Sabinâ, Abrotano, vel seorsim vel junctim, in Vino, vel Aquâ salsa*, repeating them warm with Linen Cloths, and with the medicated Bags. You will find great Benefit by applying a Sponge dipped in *Decocto Saponis Veneti in Urinâ recenti*. Your End also will be sufficiently answered by Applications of *Spiritus Frumenti*, or *Aqua Calcis, cum admixto Spiritu Vini camphorato, vel Acetum Lithargyrifatum, item Acetum cum semine Carui coctum*. These Remedies are all to be applied warm. Of larger Contusions.

XI. When the Contusion is so violent, that it is apparently impossible to divide the stagnating Fluids, and return them into the Circulation; and the Parts are hastening to become Gangrene, you must scarify them without Delay, carefully avoiding the larger Trunks of the Vessels. By this Means you will set the stagnating Fluids at Liberty, and prevent dangerous Consequences, as Tumors and Inflammations, Suppuration and Gangrene: And the Cure will be easily effected. Of violent Contusions.

XII. Having done this, you are in the next Place to apply proper Fomentations, or medicated Bags, made in the Manner we directed in Chap. XIV. What is farther to be done.

N. 10. or according to the following Prescription. *R. Rad. Bryoniæ ℥ij vel ℥iij. Herba Sabinae—Scordii—Abrotani, Arboris Vitæ, five Thuyæ vel Absinthii ana, Mij. Singula ista minutim diffecantur, affusisque Vini circiter Libris duabus, per Horæ quadrantem probè decocta, per panniculum laneum procolantur. Dehinc Saponis Veneti vel Hispani aliquot Unciæ huic decocto probè calido admiscantur, complicatique panniculi Lanei ex eodem expressi per singulas ferè Horas læsæ Corporis parti calidè superinjiciuntur.* Rub the Tumor well with hot Cloths before you foment it, which will keep the Blood in its fluid State: Or, if it is already con- creted, it will divide it, and make it fit to return into the Vessels, or at least to escape through the invisible Pores of the Skin. If you cannot be supplied with Wine to make your Fomentation, you must use salt Water; which, if you are not near the Sea, you may make of common Water two Pints with the Addition of a handful of Salt. If any one is better pleased with the Form of a Cataplasin, he may prepare a very cheap, and no less useful one in the follow- ing Manner. *R. Pulver. Radic. Bryoniæ, Saponis Veneti ana ℥iij. coq. in Aquæ recentis vel Aquæ falsæ q. s. ad Consistentiam Cataplasmatidis.* This will have still greater Efficacy if you add *Gummi Galbani vel Ammoniaci ℥j. in Vitell. Ov. q. s. solut.*

Of internal
Remedies
and a proper
Diet.

XIII. Where the Contusion is of any Consequence, you should never neglect the Administration of internal Medicines: And here your Intention is to pro- mote the Discharge of Sweat and Urine, by prescribing, dividing, and attenuat- ing Decoctions and Infusions to be drank plentifully. These may be prepared *ex Theâ, Betonicâ, Veronicâ, Salviâ, Rorismarino, Ligno Sassafras, Herbâ Arnicâ. vel Petroselini Radicibus.* The Efficacy of these Medicines in dividing inspif- sated Fluids, is scarcely to be conceived, especially if you now and then add to a Draught of one of these Infusions a Drachm of Venice Soap. You will find no less Assistance from the *Pulvis ad Casum, Augustanorum*, or from *Sperma Ceti, vel solum vel cum admixtis Sanguine Hirci, Mumiâ, Cancrorum Lapidibus, in Pulverem redact.* These may be given to a Drachm at a Dose, in a Draught of any of the former Infusions. In plethoric Habits you should never forget to open a Vein, and repeat it as often as you are threatened with an approaching Abscess or Gangrene: The Patient must abstain from Flesh and strong Liquors, living wholly upon Broths and thin Spoon-meat.

What still
remains to
be done.

XIV. The Fluids that were collected together by the Contusion being pretty well dispersed by the Methods we have recommended above, the remaining Part of the Cure that principally regards the Wound, (which frequently accompa- nies this Case) is easily performed, by filling it up with Pledgits spread with a digestive Medicine, and laying on a warm Plaster over the Dressings: Which will save the Surgeon the Trouble of preparing Cataplasms and Fomentations for this Purpose, and answer his End as well. The *Emplastra Diasaponis, Dia- chylum, de Melito, de Spermate Ceti, de Galbano*, all answer this Intention, or if you please you may use the following *R. Empl. de Meliloto ℥iv. Galban. puri solut. ℥ij. Farin. Rad. Bryon. ℥j. Flor. Sulphur. Æthiop. min. ana ℥℥. Ol. Cha- mæmel. q. s. M. f. Emplastrum.* In the mean Time the Regimen which we di- rected above, both with regard to Medicine and Diet, should be strictly ob- served. The most dangerous Contusions are cured in this Manner, much easier than by Suppuration or Scarification. Having answered the Intention of dis- persing the stagnating Fluids, and cleansing the Wound, nothing remains but

to

to forward the Union of it by Applications of the vulnerary Balsam, and at last dry Lint, as we have already advised for healing other Wounds.

XV. It sometimes happens, when the contused Parts lie very deep, or the Surgeon is ignorant of his Business, or the Patient refuses to submit to proper Treatment, that the stagnating Fluids will corrupt and suppurate. When the Suppuration is begun, it must be forwarded, 1. By emollient Cataplasms prepared *ex Rad. Malv. Althææ, Liliorum Alborum, Herbis Malvæ, Althææ, Parietariæ, Mercurialis, Brancæ Ursinæ, Meliloti, Verbasci, Ficubus, Lini Semine, Fænogræco, Farinis Variis, Micis Panis cum affuso Aquâ vel Lactæ costis ad Pul-ticulam, Butyroque, Adipe, Oleisve emollientibus, Lini scilicet, Chamæmelæ, Li-liorumque Oleis dilut.* These are to be applied to the Part as hot as they can be well born. 2. Sometimes in this Case it will be proper to mix warm Medi-cines with Emollients, such as *Cepæ sub Cineribus tostæ, Fermentum Panis, va-ria Gummata, Galbanum scilicet, Ammoniacum, Bdellium, Opoponax in Vitell. Ovor. soluta.* These are to be mixed with the emollient Ingredients which we enumerated above. For Example, *R. Herbæ Malvæ, Althææ, Parietariæ, Meliloti ana Mi. concisa coquantur in Aquâ simplici q. s. adde Consistentiam Ca-taplasmat. Adde Ceparum sub Cineribus Assatarum, ℥iv. Galbani, Vitell. Ov. solut. ℥ii, Ol. Lilior. Albor. ℥i℥, Farinæ Sem. Lini q. s. ad Consistentiam.* These Applications are to be repeated till the Suppuration is thoroughly formed. In small Contusions the *Emplastrum Diachylon cum Gumm.* will sufficiently answer this Intention.

How the
Parts are to
be treated
when they
suppurate.

XVI. When the Whiteness and Softness of the Tumor evidently discover that the Matter is thoroughly formed, and fit to be discharged, you may lay open the Part with your Knife, and afterwards digest and heal the Wound in the same Manner as we have frequently directed above. If it breaks of itself, it should be treated in the same Manner. Where the Aperture is too small, it must be enlarged with your Knife, that it may be easier cleansed, and more conveniently healed.

How the
Matter is to
be discharg-
ed.

XVII. Large Contusions are sometimes attended with violent Inflammation or Gangrene; in this Case make frequent and deep Incisions upon the Part, and dress the Wounds *cum Theriacâ Spiritu Vini Camphorato dilut.* applying warm Fomentations externally, not omitting the internal Medicines prescribed at N. XIII. (but I shall treat more largely upon this Head in a Chapter upon *Gangrene and Sphacelus.*) When a Sphacelus is begun, if it is only in the common Integuments, you must apply Scarification, a digestive Ointment, Medicines that resist Gangrene, and Suppuration. But if the whole is sphacelated, that is, entirely corrupted and mortified, the Limb must be entirely taken off, in the Manner we shall shew you when we come to describe *Chirurgical Operations.*

How a Gan-
grene and
Sphacelus are
to be treated.

XVIII. When the internal Parts are contused, unless the Patient has imme-diate Assistance, Inflammations, Suppuration, and Gangrene instantly ensue; which soon terminate in Death. Therefore, in these Cases, the Surgeon should endeavour to dilate and attenuate the concremented Blood with the utmost Expe-dition, by frequent Blood-letting, by gentle opening Medicines and Clysters, Chap. XIII, N. XXXVII, by prescribing the warm Decoctions and Infusions which we directed above at N. XIII. If the Disease is curable, these Methods will pre-vent Suppuration or Mortification. These Parts do not admit of Incision, and the Use of absorbent Powders, such as *Lapides Cancrorum, Sanguis Hirci, Coram Cervi,*

Core of in-
ternal Con-
tusions.

Carvi, Pulvis ad Casum, and the like, is trifling in this Case. We have already sufficiently explained how Contusions of the Head in particular ought to be treated, in the preceding Chapter. But in Contusions of the Breast, or the Belly, you can direct nothing better externally than a Compress, steeped in Spirit of Wine camphorated, or a Bladder filled with warm Milk, in which the Flowers of Chamomile or Alder have been boiled. Apply these continually warm to the Part affected. For further Applications, consult the Method laid down for the Treatment of Wounds in these Parts.

Contusions
of the Eye.

XIX. When the Eye, that most noble and beneficial Organ, is contused by any Accident, it will swell immediately, and be entirely deprived of Sight, except the Contusion is very small, and proper Remedies are instantly and carefully applied. If the Eye therefore has received a slight Contusion, you may wash it frequently, for the first Day, with cold Spring Water, covering it with Linen Rags, wet with the same: On the next Day, rub it externally *cum Spiritu Vini camphorato*, covering it with Stuphs wrung out of vinous Decoctions *ex Euphrasiâ, Veronicâ, Hyssopo, Salviâ, Florib. Chamæmel. & Semin. Fœnicul.* If you cannot get these Herbs, you may apply Bolsters, dipped in *Vino calido*, renewing them often. If the Contusion is large, or the Patient of a plethoric Habit, you should open a Vein. *On Bloodshot Eyes, see CELSUS, pag. 369.*

Of violent
Contusions
of the Eye.

XX. If the Contusion of the Eye is so violent, that you can plainly see the extravasated Blood through the *Cornea*, and all Objects appear red to the Patient, open a Vein either in the Foot or Neck, as you shall think most convenient, and repeat it, if necessary: Foment the Eye with Stuphs wrung out of the Decoctions which we prescribed above, and order him to bathe his Feet in warm Water two or three times in a Day, advising him also to observe the same Regimen with regard to Diet and internal Medicine, which we described at N. XIII. By the strict Observation of these Rules he will recover his Sight, if the Disorder be not become desperate, especially if you frequently drop warm Pigeon's Blood into the Eye. If these Attempts to disperse the stagnating Blood are frustrated, you may very probably succeed by making an Opening in the *Cornea* with your Lancet. The Manner of doing this to Advantage you will find described in *Chap. LX, and LXI. of the Second Part* of this Work, which treats professedly of *Operations*.

CH A P. XVI.

Of VENOMOUS WOUNDS, and those that are made by the BITES OF ANIMALS.

Poisonous
Wounds are
difficult to
distinguish.

I. **W**E are informed by antient Tradition, that the *Indians*, and the barbarous Nations all over *Africa*, used to poison their warlike Weapons, to aggravate the Wound, and destroy their Enemies with greater Certainty; which some of them continue to this Day. This Custom has long ago been laid aside by the *Europeans*, as inhuman. Wounds that are inflicted by Weapons of this Kind, are attended with extreme Danger: For, as this Sort of Mischief is in a great Measure concealed and unexpected, there is no Room to make

make use of proper Precautions to prevent or remedy the Evils that will ensue from it.

II. For though several *Physicians* and *Surgeons* have asserted, that you may distinguish Wounds made by a poisonous Weapon, not only by the filthy Stench of the wounded Parts, and the unusual Colour of the Discharge that proceeds from them, to wit, yellow, green, livid, and black; but particularly by the Increase of Pain, by the extravagant Degree of Tumor and Inflammation that they are attended with; Palpitation of the Heart, Swooning, Spasms, Distortion, or Rigidity of the Limbs, cold Sweats and Shiverings, with which the Patient is constantly afflicted in this Case. Nevertheless, if I may be allowed to judge, I must determine these Symptoms to be altogether doubtful and uncertain. For what Surgeon does not know, that all these Symptoms may be brought on either by the bad Habit of the Patient, or from the Nature of the wounded Part, if it is nervous or tendinous; or, in a word, from an hundred other Causes, where Poison is no ways concerned?

For the Marks of them are very uncertain.

III. You have much greater Certainty of a Mixture of Venom in the Wound, when it is made by the Bite of a *venomous* or *mad Animal*, (for there is scarce any Species of Animals but what is at some times subject to Madness) especially of a Dog, a Cat, a Wolf, an Ape, a Man, a Serpent, a Scorpion, or of any other venomous Insect. But since the Coldness of our Climate renders us very rarely subject to Injuries from the Bites of venomous Serpents, or indeed of any other venomous animal but a *mad Dog*, it will be most to our Purpose to treat chiefly of that Subject; at the same time not entirely neglecting the Description of other Wounds inflicted by Biting. And first we shall speak of the Bites of Animals which are not mad.

Of Bites.

IV. Bites of enraged Animals are attended with very grievous Consequences, though they are not afflicted with Madness. ^a CELSUS has long ago taught us, that the Bites of a ^b Man, an Ape, a Cat, a Dog, or of any wild Beast or other Animal, frequently bring on terrible Mischief. In that Passage of his where he says, *Omnis ^c ferè morsus quoddam virus habet*, “Almost all Bites whatever have something poisonous in them.” He is not to be understood as if he had asserted, that all Wounds, made by Bites, have actually some Particles of Poison, properly so called, instilled into them; but rather as speaking of the bad Symptoms which must necessarily ensue from the violent Laceration and Contusion of the Muscles, Nerves, Tendons, Ligaments, and Bones, by the Bite of a large Dog, a Horse, a Wolf, or a Bear, or any other large Animal. If the Wound is slight, encourage the Discharge of Blood from the Part, by pressing it with your

Bites of Animals which are not mad.

^a *Lib. v. Cap. 27. N. 1.*

^b PANAROLI *Pentec. 2. Obs. 42.* HILDANI *Cent. I. Obs. 84, & 85. ac De morsu equi*; *ibid. Cent. II. Obs. 86.* SEREN. SUMMONIC. *Cap. De hominis & simia morsu.*

^c In several Editions of CELSUS you will find *FERÆ* for *FERE*; *Omnis autem FERÆ morsus quoddam virus habet*; but I think the other Reading preferable to this; for CELSUS does not treat in this Place of the Bites of wild Beasts alone, for they are very uncommon Cases, but of the Bites of a Man, an Ape, and particularly of a Dog, (which Animals he manifestly distinguishes in this Place from wild Beasts) which Bites he describes as bringing on violent Mischiefs, especially if the Animal is much enraged. Therefore CELSUS very properly, in an extensive Sense, declares, *Omnem FERÆ morsum habere quoddam Virus, sive Venenum*; which Opinion is not applicable to wild Beasts alone, but to all Animals whatever, for Reasons which we shall presently lay down. MORGAGNI is of the same Opinion with me concerning the Interpretation of this Passage, which he explains, according to his usual Custom, with great Learning and Perspicuity. *In Epistol. in CELSUM, pag. 126.*

Fingers, sucking it with your Mouth, or by the Application of Cupping-glasses, or by enlarging the Wound with a Lancet: Wash it afterwards with warm Wine, or camphorated Spirits of Wine, and apply Bolsters to it dipped in the same Liquor, repeating it every three or four Hours till all Danger of Inflammation is gone off. CELSUS recommends Salt, as the best Remedy for the Bite of a Dog, if it is applied dry, and well rubbed in. It is afterwards to be healed with the Oil of Turpentine, or some vulnerary Balsam. If the Wound is very considerable, it will be absolutely necessary to enlarge it with the Knife, unless the Opening is already very large. The Discharge of Blood also should be encouraged in this Case, by the same Methods which we advised in the foregoing; and you should open a Vein to prevent a dangerous Inflammation. I lately saw the bad Effects of a Neglect of this Practice, in the Case of a Boy who was bit by a Dog near the Knee, and was seized with a violent Inflammation over the whole Leg and Thigh, for want of a proper Evacuation of Blood. The Wound should be diligently washed with Wine, warm Spirits of Wine, or salt Water, dressing it up with Lint and Linen Bolsters wet with the same Liquors: These Dressings are to be repeated frequently every Day, to prevent a violent Inflammation. You may dress afterwards with Honey, or a digestive Ointment, and heal with a vulnerary Balsam, as in other Wounds.

How to
know a mad
Dog.

V. In order to know whether your Patient has been bit by a mad Dog, it is necessary that we should first settle the Marks by which a mad Dog is distinguishable from other Dogs. When a Dog is mad, he foams at the Mouth, and lolls out his Tongue, claps his Tail betwixt his Legs, and runs up and down without ceasing, as if he was pursued; he makes a hoarse Noise when he barks, and is afraid of all Animals that come in his Way, snapping at every thing he meets, even at his own Master, upon whom he used to fawn: Other Dogs are afraid of him, and avoid him.

Mischiefs
that ensue
from the
Bite of a
mad Dog.

VI. Men that are bit by a mad Dog are usually afflicted with grievous Disorders, sometimes sooner, sometimes later, in Proportion to the Malignity of the Poison that is imbibed by the Wound, and to the Patient's Habit of Body at the time he receives the Bite. When once the Poison begins to exert itself, the Patient is seized with great Anguish, continual Groanings, Sighing, acute Pains, and Fevers.

Prognosis.

VII. If nothing is done to relieve this Disorder, he is seized with a *Hydrophobia* about the ninth Day, a miserable Circumstance! since he is continually afflicted with Thirst, and at the same time labours under such a Dread of all Fluids, that he durst not satisfy it, but rages and foams like a Dog, till being quite spent, he^a expires. Therefore in this Case it well behoves us to be early in our Applications to Wounds of this Kind; for when the *Hydrophobia* appears, nothing is to be looked for but certain Death^b.

How the
Wound is to
be treated.

VIII. Where shall we find a Remedy for this dreadful Disorder? Many are of Opinion, that to push a Man unawares into a Pond or River is a certain Cure;

^a There have been several Instances where the Poison has lain dormant in the Blood for one, two, nay for several Years, and has at length broke out, and carried off the Patient after the usual Manner. WEBSTER has given us several surprising Relations of this Kind in his Book *De Magiâ*.

^b It will be worth your while to consult VERDRIES upon this Subject, in *Lib. De æquilibrio ment. & corpor. circa snem*. And MARESCOTTUS *De Variolis*, pag. 57. where he treats of the *Hydrophobia*.

this was a common Remedy in the Times of CELSUS, *Lib. V. Chap. 27.* Some think it sufficient to bathe the wounded Limb frequently in cold Water for several Days together, and to dress the Wound with some of the mad Dog's Hair: They imagine this last Method cures a Man by *Sympathy*, as they affect to call it. Others, as CELSUS advises, throw the Patient into Water when the *Hydrophobia* is coming on, and endeavour to force him to drink against his Will; for by this Means, they assert, that they take off his Thirst, and the Dread of Water at the same time. On the other hand, almost all the most experienced Surgeons recommend the following Method as the safest and most worthy to be tried: To enlarge the Wound with the Knife, to promote the Flux of Blood, to cleanse it *cum Aquâ falsâ, vel cum Aceto, vel Spiritu Vini & Theriacâ*, and to endeavour to draw out the Poison by Cupping-glasses: And, lastly, if the Texture of the Part will permit it, that is, when only the common Integuments or fleshy Parts are wounded, they apply the actual Cautery to the Wound, and dress it afterwards like other Burns. But if the Part affected will not admit of the Cautery, the Wound must be enlarged by Incision, then dressed with Vinegar and Treacle, and covered with a Bolster dipped in the same Ingredients: And to prevent Inflammations and a consequent Fever, a Vein should be opened (especially in plethoric Habits) agreeable to the Practice of the Antients. See CELSUS, *Lib. V. Cap. 27. N. 2.* AQUAPENDENS, in *Operat. Chirurg. pag. 331.* adviseth this Method to be used to all Wounds that are infected with Poison: But in these last Cases you should first diligently enquire, whether the Arrow or other Weapon, by which the Wound was inflicted, was poisoned or not, or whether the Violence of the Symptoms give you sufficient Reason for such Conjecture. For where it remains doubtful whether the Weapon was poisoned or not, you should deal more tenderly with your Patient, and not proceed to the Use of the actual Cautery, but treat the Wound after the Method just described.

IX. KOEMPFER, who was one of the chief Physicians in the *Eastern Countries*, and well versed in the Nature of the venomous Serpents, with which that Part of the World abounds, tells us in his *Anamitat. Exotic. pag. 581.* and in his *Itiner. in Chinam & Japan*, that he has frequently cured the Bites of these Animals without the Help of the Cautery, by making a Ligature upon the Limb above the injured Part, and scarifying the Wound, anointing it well afterwards *cum Theriacâ*, and covering it with a Cataplasim made of the same Medicine, giving also a Dose of it frequently by way of Sudorific. He declares, that he never lost a Patient, where he had an Opportunity to treat him in this Method. As this is a simple, easy Method, and proves by Experience to be a very safe one, I see no Reason why we should not prefer it to one attended with great Cruelty and Pain in the Operation. Yet this Method may be found less effectual in curing the Bites of *European Serpents*.

X. Some anoint the Wound with the *Oleum Nucis Moschatæ* instead of the *Theriaca*. Others apply a Toad to the Part, either alive, or dried and softened with Vinegar, imagining that this Animal has a specific Virtue in extracting Poison from a Wound. Others again are extremely fond of the *Ophites*, or serpentine Stone, called *Pedro del Cobra*, which they are told is found in some Species of Serpents in the *Indies*. They affirm, that if you lay this Stone upon a Wound made by the Teeth of a venomous Serpent, or Viper, it will imbibe all the Poison, and if you afterwards soak it in Milk, it will deposit it in that Fluid. Com-

pare with this Place, KOEMPFER, in *Amanitat. Exotic. pag. 57, & seq.* though he only advises it *contra Serpentum iētus*; but the celebrated VALLISNERIUS, in his Book *De Generatione*, p. 141. denies that it is equal to the Cure of a Bite from an *Italian Viper*; therefore, I think, very little Credit is to be given to it. The following Cataplasm is in great Reputation with some for this Intention, *R. Cepæ sub Cineribus affatæ, & Allii Bulbum unum, Theriacæ, Fermenti Panis Valentissimi ana ʒj. Sinapi ʒʒ quæ singula infuso aceto calido in formam Cataplasmatidis probe conteruntur, Vulnerique superimponuntur.* Dr. MEAD recommends Viper Fat as a certain Remedy for the Bite of a Viper: And since that, Olive Oil has been in the highest Esteem.

The rest of
the Cure.

XI. In a Day or two after your Patient has been bit by a mad Dog, the Wound should be dressed *cum Melle vel Unguento digestivo admist. Ung. Ægyptiaco, vel Mercurio Præcipitato Rubro bis quotidie.* It may be kept open with these Dressings for some Weeks, or for about forty Days, till the Poison is thoroughly discharged. You should always be very careful not to heal Wounds of this Kind too soon, especially where they have not been cauterised; for the principal Part of the Cure in these Wounds consists in keeping the Part open, and encouraging a Discharge: Wherefore CELSUS always recommends very stimulating Medicines.

The internal
Method.

XII. Besides the external Remedies that we have advised, it will be proper to prescribe strengthening Medicines and Sudorifics to be given internally, according to the Strength of the Patient. Some of the Antients, according to CELSUS, put the Patient into a warm Bath, and sweated him there as long as he could bear it, with the Wound uncovered, that the Poison might distil out in greater Quantities, washing it well afterwards with Wine, which is an Enemy to all Poisons. When they had repeated this Process for three Days, they thought him out of all Danger. It would be very convenient in this Case to give him now and then a Glass of Wine inwardly, and a Spoonful or two of good Wine-Vinegar, in which some Sage had been boiled, with a Drachm of *Theriaca* in it; and between whiles to administer Draughts of *Infusum Scordii vel Salviæ in Aquâ calidâ*, putting the Patient into a warm Bed, or into a Bath, to encourage him to sweat largely: This should be done for several Days successively. You may give, for several Mornings, *Valerianæ Radicis ʒj.* in the room of *Theriaca*, which I find is much the Practice in *Italy*; or *Radix Gentianæ*, in the same Quantity, with a Draught of one of the Infusions which we just now prescribed. Some, after the Example of GALEN and BOYLE, instead of *Theriaca*, give *Sal volatile Viperarum, vel ex Cancro Fluviatili combusto paratum*, which they have so great an Opinion of, that they venture to affirm it to be an *infallible Specific* in this Case.

XIII. Several amongst the Moderns recommend the *Scarabæus Maialis melle conditus & tritus, vel Scarabæi Succus*, which they suppose to have very great Efficacy in destroying Poison, and preventing its bad Effects, if it be repeated for some Days. Others have no less Opinion of the Virtues of the Heart, Liver, or Brain of a mad Dog or Wolf, which they affirm to have very salutary Effects, if given to the Patient in Time; but for many Reasons I think this by no means a justifiable Practice. PARÆUS directs *Garlic* to be given frequently. But I think the moderate Use of some generous Wine, and the Juice of Citrons and mild acid Fruits, or Wine-Vinegar, either simple, or mixed with Honey, will be
of

of great Service, not only in strengthening the Patient, but in destroying the Poison.

XIV. The same Methods of Cure which we advised above, *N. VIII, and XIII.* will be serviceable against the Stings of *Scorpions*, or other venomous Animals. The Scorpion affords an easy Remedy against his own Sting; for some bruise him and lay him upon the Wound; others drink him in a Glass of Wine. See *CELSUS, Lib. V. Cap. 27. N. 3.* where he says, *Venenum Serpentis non gustu, sed in vulnere nocet.* Some dress the injured Part with Oil of Scorpions, which they esteem a sure Method of Cure. Others do nothing but draw Blood from the Arm. The Antients in this Case hired Men to suck the Blood and Poison out of the Wound, which they did, spitting it out again, without injuring themselves in the least. See the above cited Passage from *CELSUS*: But the Patient at the same time did not neglect the Use of the Methods which we prescribed above, both with regard to internal and external Medicines and Applications. The best Cure for the Sting of Bees or Wasps is, *Acetum cum Theriacâ*, or *Theriaca cum Spiritu Vini*, or *Bolus Armena cum Aceto*. The Method of Curing a Gangrene arising from the Bite of a Horse, may be seen in *HILDANUS, Cent. ii. Obs. 86.*



INSTITUTIONS OF SURGERY.

PART II. BOOK II. Of FRACTURES.

CHAP. I. Of FRACTURES in general.

Fractures,
what.

I. **U**NDER the Name of *Fracture*, speaking in general Terms, we conceive every Solution of Continuity in the Bone, either from an internal or an external Cause, whether the external Cause was a sharp or blunt Instrument. But as we usually call those Injuries of the Bone that are brought on by acute Instruments *Wounds of the Bone*, so we properly call those *Fractures of the Bone*, where the Bone is broken by the Force of a blunt Instrument. Therefore Fractures generally happen when any Part of the Body where a Bone is situated receives a violent Shock, either by a Fall, by Jumping, or a Blow with a Piece of Timber, a Stone, or by a Shot from a Gun. There are also Instances where this Accident has happened from an internal Disorder, to wit, from the Scurvy, a Caries, or the Venereal Disease, which have rendered the Substance of a Bone so brittle, that it has been fractured without any apparent external Accident. See CELSUS, L. viii. C. 1. MARCELL. DONATUS *Hist. Med.* L. iv. C. 5. ex PANDOLPHINO, p. 272. CONNOR, *Diff. Med. Phys. de stupendo Ossium coalitu*, pag. 11. *Fractura Ossium a Causâ internâ mirabilis*. SAVIARD, *Obs.* LXII. HEYNE *De Ossium Morbis*, N. XXIX.

Different
Species of
Fractures.

II. We may distinguish Fractures into several Classes or Species. First, every Fracture is either *simple*, that is, when no other Parts beside the Bone are injured; or *compound*, that is, when you have at the same time a Wound, a Dislocation, Hæmorrhage, Inflammation, Fever, Caries, or Contusion of the Bone; or where the Bone appears to be fractured in several Places, or more than one Bone, at the same time. Other Differences arise with regard to the Situation of the Fracture: Sometimes it happens in the Cranium, Ribs, Clavicles, Vertebrae; sometimes in the upper or lower Limbs; sometimes in the Middle of the Bone; sometimes in either of the Extremities. Again, some

Fractures

Fractures are transverse, others oblique; in which Case it frequently happens that the Points of the Bones wound the neighbouring Parts, pushing quite through the muscular Flesh and common Integuments, or at least pricking them grievously, and bringing on Pain, Inflammation, Tumor, and Spasms. Violent Contusions also may be classed under the Head of Fractures; for the Bones in this Case are frequently broke into Splinters by the falling of any heavy Body upon the Part, or by Fire-arms, or the Pressure of Mill-wheels, or the Wheels of Carriages.

III. To Fractures of the Bones we may very properly add *Fissures*, when the Bones are divided either transversely or longitudinally, not quite through, but cracked after the Manner of Glass, by any external Force: For although most Surgeons have looked upon the mention of Fissures as an idle Jest, especially of those that are said to be made in a longitudinal Direction, and others have passed them over silently in their Writings, or where they have by Chance been mentioned, no Method of Cure has been directed for them: Yet there is not one of them that I know of, who was ever able to demonstrate the Impossibility of these Fissures; since they often happen in the *Cranium*, and indeed in other Bones. All they can pretend to alledge is, that they have never fallen under their Observation; but I find Instances of this Kind of Disorder, with a Method of Cure described for it, in Authors of undoubted Credit. See HEYNE *De Morbis Ossium*, N. XXIX. and particularly that famous German Surgeon FELIX WURTZIUS, in *Chirurg. Part II. Cap. 28.* which makes me so far from calling the Fact in question, that I think it ought rather to be a Spur to a young Surgeon to consider well the Marks that WURTZIUS has described, and to make a more diligent Search after Cases of this Kind, than has hitherto been made. We shall speak more largely to this below.

IV. It is no difficult Matter to examine *Fractures of the Bones*, 1. *By the Eye*, How Fractures are to be discovered. when the Pieces appear through the Skin, when the injured Part is apparently shorter than the sound, or when you see that the Patient cannot make Use of it. 2. *By the Touch*, when you perceive a præternatural Inequality of the Bone, or that it bends in a Part where Nature never intended it should; and here, by the way, we must recommend it to the Surgeon, if it be possible, to fix the Patient immediately, at the first searching of the Fracture, where he is to lie, during the Course of the Cure. 3. *By the Ear*, when we hear the Ends of the broken Bones crush against each other upon moving the Limb. But, 4. We may strongly suspect a Fracture of the Part, when it has received a Blow with great Violence from a heavy Body. And, 5. We should not neglect to observe, that the Parts are more subject to this Injury in Winter, than in Summer. Lastly, 6. Sometimes, particularly in Fractures that are made in a transverse Direction, the broken Parts of the Bone will immediately of themselves recover their natural Situation, and leave very little room to suspect the Disorder. Therefore it is necessary to be very cautious and prudent in forming your Judgment in Cases of this Kind. If your Patient has entirely lost the Power of moving any Limb, or puts it in Action with the greatest Difficulty, after having received a violent Blow upon that Part; or if he feels violent Pain when you handle it, or move it for him, this affords great Reason to suspect a Fracture. But to make yourself more certain in this Case, it will be proper to take hold of the injured Limb with both your Hands, and ordering an Assistant at the same

same time to move it about, attend diligently whether you cannot hear the broken Ends of the Bone rub against each other, and observe whether you cannot discover a præternatural Dent or sinking in any Part of the Limb. The Motion that your Assistant makes should be done with great Care and Tendernefs.

How to discover Fissures.

V. *Fissures in the Bones* are not easily detected; since neither your Senses of Seeing, Feeling, or Hearing can give you Light enough to determine any thing with Certainty in this Case: And this seems to be the Reason why most Surgeons are deceived in this Case, as GOVEIUS well observes in his *Chirurgie veritable*, pag. 79. If we will believe those Authors, who declare to us, upon their own Experience, that these Cases sometimes happen, we shall find there are sufficient Signs to discover a Fissure of the Bone. They always suppose a Fissure when you have such violent Pains after any external Violence, that the injured Part will not bear handling, and cannot support the Parts above it; when you have more than ordinary Tumor, and these Symptoms do not yield to the usual Applications. After this you are to expect violent Inflammations, Suppurations, Fistulæ, and Caries. These Authors are of Opinion, that aged Persons are most subject to this Disorder, because their Bones are very brittle. When we consider the Nature of a Fissure, we shall not be long in guessing whence all the bad Symptoms attending it can arise: For the Bone being once cracked, the Blood and Sanies which fills up the Vacancy will presently putrify and corrupt the Medulla, the neighbouring Parts, and at last the Bone itself, which will easily produce the Mischiefs we have described.

Disorders attending a fractured Bone.

VI. Great variety of Mischiefs attend a fractured Bone; which differ, 1. With regard to the injured Part, and the Nature and Disposition of the neighbouring Parts. 2. With regard to the Manner in which the Fracture is made; for oblique Fractures, and those whose Splinters or Points wound and vellicate the neighbouring Parts, are much more painful and dangerous than transverse Fractures. Fissures are attended with more or less Danger in Proportion to their Size, as appears from what we have delivered above. But, 3. We may judge of the Mischief that is likely to attend a Fracture, from the Number of Pieces into which the Bone is broken. And, 4. By observing whether the Fracture happens in the Middle of the Bone, or at either of its Extremities. The principal Inconveniencies that attend a Fracture, are these: The Patient loses the Use of the Limb, the lower Part of the Limb will be contracted by the Muscles, which will make it appear distorted and deformed. The Laceration of the *Pariosteum*, and the Vessels of the *Medulla*, bring in great Danger of Fistulæ and Caries. When the Nerves are pricked and irritated by Splinters or Points of the broken Bone, the Patient suffers great Pain, Convulsions, Inflammation, and Fever. If any Vessels suffer Pressure, the Circulation of the Blood is retarded: Therefore no Wonder if Inflammations, Abscesses, Gangrene, and Death, are the Consequences: If the Pressure is upon a Nerve, the Part to which it was determined becomes Paralytic, losing both Sense and Motion, and by Degrees usually wastes. Sometimes, whilst the Bone is uniting, the broken Parts are supplied in too plentiful a Manner with Juices, and the Callus is formed irregularly, which occasions Deformity in the Limb. When you have a Wound in the fleshy Parts in Conjunction with a Fracture in the Bone, you will most likely be troubled with a violent Hæmorrhage: When the Blood-vessels are injured, the Skin remaining sound and unhurt, great Effusions of Blood, and dange-

dangerous Swelling and Suppurations, are the general and almost inevitable Consequence.

VII. The Surgeon ought to be very cautious in delivering his Prognostic concerning Fractures. He should avoid being too hasty in promising a quick, easy, and certain Cure, lest his Art should be overcome by accidental Disorders, and he be accused of Knavery or Ignorance. For I don't know how it happens, the most unskilful Persons in Surgery speak of fractured Bones, as Cases of the least Importance, and make nothing of promising a Cure: Whereas it is undoubtedly true, that it is sometimes impossible to restore a broken Limb to its former Shape and Strength, though your Surgeon is perfectly Master of his Art. Therefore since Fractures are sometimes cured easily, but at other Times are attended with the worst of Consequences, it will be an Argument of Discretion in a Surgeon to deliver his Prognostic in such a Manner, that it may not regard the fractured Part alone, but may give Warning also of the Accidents that are likely to happen to the neighbouring Parts, or which may be occasioned by the Age, or the bad Habit of Body of the Patient, or by any other Circumstances: And in this he should always take Care not to be over hasty.

Prognosis in general.

VIII. I would recommend the following Observations to the Surgeon.

1. Simple Fractures, when you are called soon after the Accident, are much easier cured than Fractures that are complicate with an external Wound, a Dislocation, a great Contusion, an Hæmorrhage, a Caries, or with any other grievous Disorders.
2. Fractures are more easy or difficult of Cure, according to the Part on which they happen. Thus small Bones, such as the Clavicles or Ribs, or the Bones of the Fingers, are usually cured in twenty Days; the Radius, or Cubitus, in thirty; whereas the Os Humeri, or the Tibia, require from thirty to fifty Days; and the Os Femoris does not thoroughly unite till the sixtieth or seventieth Day.
3. Men of good Constitutions, and in the Prime of Life, are cured sooner, with less Trouble, than Persons of a bad Habit of Body, or advanced in Years.

In particular.

IX. Where the Situation of the Bone is not altered by the Fracture, or the broken Parts start very little, they are much easier replaced, than where they are entirely separated from each other, and a great Space intervenes between them. Transverse Fractures admit of an easier Cure than oblique Ones. Fractures near the Articulations are attended with worse Consequences than those which are made above the Middle of the Bone: For where the Fracture happens near either Extremity of the Bone, the Joint frequently suffers, which occasions Loss of Motion in the Part, the Ligaments also and Tendons are usually bruised in this Case; from whence arise violent Pains, Inflammations, and Convulsions, and sometimes even Gangrene, and Death itself; or at best, the Patient must submit to an Amputation.

X. When two Bones of the same Limb are fractured, the Cure is more difficult than when this Accident happens only to one of them. When the Bone is broken into several Pieces, the Patient will seldom escape Abscesses, or even Gangrene or Sphacelus; that either the Limb must be taken off, or Death will ensue. At least the Cure will require a great deal of Time, and the Limb will never entirely recover its Shape. Therefore where a Surgeon sees this, he ought always to forewarn the Patient, or his Relations, what Danger he apprehends.

XI. Where the broken Bones are instantly reduced, your Cure will be performed with greater Ease, than where they have been for some Time separated.

Therefore

Therefore where the Surgeon is called a considerable Time after the Fracture has been made, he cannot promise to reduce the Bones easily, or to make a speedy Cure.

XII. When any Parts of great Consequence to the animal Œconomy are situated in the Neighbourhood of the Fracture, the Case will certainly be attended with great Danger, if not with Death. Such are Fractures of the Cranium, from Vicinity of the Brain; of the Vertebrae, from the Medulla Spinalis; of the Ribs or Sternum, the Offa Ilei and Pubis, from the Situation of the Viscera of the Thorax, and Abdomen. Fractures also of the Bones to which the larger Arteries or Veins are connected, are very dangerous; more particularly when any Splinter or Point of the broken Bone vellicates or wounds a large Vessel: For very violent, if not mortal Hæmorrhages must necessarily ensue, especially when this happens in the Axilla or Groin, which is often the Case.

XIII. When the Ends of the fractured Bone break through the Muscles and common Integuments, you will find great Difficulty in reducing the Bone to its proper Situation, from the great Number of Muscles, Nerves, and Blood-vessels that lie in the Way: The Laceration of which will bring on great Mischiefs, and frequently Deformity and Weakness upon the Limbs, especially if it is the Os Humeri, Tibia, or Femur, so as to render the Amputation of it necessary.

XIV. The most temperate Air and Season of the Year is most convenient for the Cure of this, as well as all other Disorders. The Cure also succeeds more happily in Children and young Persons than with aged Persons. When Fractures happen to big bellied Women, they are seldom cured till they have got rid of their Burthen.

XV. When the Bone is broken into several Fragments, the Consequences are generally Inflammations, Suppurations, or Fistulæ, which will not admit of any Remedy till the Splinters are all removed. If the Fracture is occasioned by an internal Disorder, such as a Caries of the Bone, you will find it much more difficult to cure, than when it proceeds from any external Violence: Nay, it is frequently an incurable Case, unless the Occasion of it, to wit, a scorbutic or dropical Habit of Body, or a venereal Taint, be removed.

XVI. When a large Piece of Bone is driven away by a Pistol or Musquet Ball, it is better to cut off the lower Part of the Limb, since the two Ends of the Bone are never likely to unite, than to deceive the Patient with the fruitless Hopes of a Cure, and weaken him to the last Degree, with the Attempt^a. But when only a small Piece of the Bone is carried off in this Manner, you may safely enough attempt the Union of the Parts, but the Limb will be ever shorter than the other; and if the Injury is in the Foot, he will be always lame.

XVII. When the Blood insinuates itself through a Fissure into the internal Part of the Bone, by corrupting there, it produces a Caries, or Spina Ventosa, incurable Fistula, Tabes, and Sphacelus, which always require Amputation of the Limb, and frequently destroy the Patient. The same Accidents will happen in Fractures of any Kind, when the extravasated Blood mixed with the Medulla, and corrupts it.

XVIII. Fractures of the lower Limbs are much more inconvenient than those of the Arm: Though Disorders of the upper Limbs are easier concealed,

^a HORSTIUS, in *Observ. Med.* P. II. Lib. IV. Obs. 10. gives us an Account of a Man who suffered a Loss of Substance in the Bone of his Foot, of the Size of three Fingers Breadth. But he cured his Patient without leaving any Lameness. If the Story is true, it is very extraordinary.

whereas those of the lower Limbs appear presently, especially in Men, from the Lameness and Deformity which they occasion, which require great Care in the Treatment of them. On the other hand, the Deformity is more conspicuous in the Arms of Women: In these Fractures, therefore, more Care is required, and a nicer Operation, that the Callus may be formed as smooth as possible. But where there is a Fracture of the Bones from Gun-shot Wounds, especially on the Joints, as the Tarsus, the Knee, Elbow, Shoulder, or Thigh, it is attended with great Danger, and often with Death, if not prevented by immediate Amputation.

Cure of FRACTURES.

XIX. The Surgeon's principal Care in Fractures is to unite the broken Bone, Cure, to which three Things are necessary. 1. That the Bone be restored to its natural Situation, which is to be done by extending it and replacing it. 2. That after the Bone has recovered its natural Situation, it be kept there by giving it Rest, and applying proper Bandages. Lastly, 3. You are to use proper Means to prevent, or remedy, the Disorders that usually attend this Accident. The Knowledge of Anatomy is necessary to perform these Intentions: For, 1. The Surgeon must be acquainted with the Situation and Structure of the Bones, that he may know whether the injured Limb is supported by one or more Bones, whether they are large or small, whether they are firm or spongy, whether they are even or uneven, whether one or more Bones are broken at the same Time. 2. What Muscles there are in the Neighbourhood of the Bone, their Situation and Office. Lastly, Whether any considerable Nerves or Blood-vessels are near the fractured Part: All which Things are absolutely necessary to be known by any one, who expects to succeed in the Cure of these Disorders.

XX. When the fractured Bones maintain their natural Situation, you are under no Necessity of extending or replacing the Limb, but of applying a proper Bandage. But when the fractured Parts recede from each other, some Degree of Extension is necessary, which must be always suited to the Distortion of the Limb. The greater Distance there is between the Extremities of the divided Parts of the Bone, so much shorter will the Limb be, from the Contraction of the Muscles; therefore the Extension in this Case ought to be in Proportion so much the greater: But to prevent the Patient from suffering any Violence, every Thing ought to be done tenderly, and with great Care.

XXI. The Extension of fractured Limbs ought to be performed in the following Manner. 1. The Patient is to be kept firm and steady: The Posture of Body, to be observed at this Time, differs according to the Circumstances of the Case: Sometimes the Patient should sit, either upon a Stool, or upon the Floor; sometimes it will be better for him to lie upon a Table or a Bed. 2. An Assistant should support the Limb with his Hands, both above and below the fractured Part. 3. The Assistant who holds the lower Parts of the Limb should extend it strongly, till you can replace the fractured Part of the Bone: If his Hands alone are not sufficient to make the required Extension, he must use a Cord, or rather a Napkin: If one Man has not Strength enough for this Office, you must employ two, or more. You must be very careful not to

Of Extension.

How the Extension is to be made.

use too great Roughness in this Operation, lest you should give your Patient unnecessary Pain.

Means used
by the An-
tients for
Extension.

XXII. The Surgeons amongst the Antients, when they found that neither Hands nor Napkins were sufficient to make a proper Extension, (which was indeed a very rare Case) contrived several mechanical Instruments to answer this End. For this Purpose you will see several Pullies with Ropes described; the *Scamnum Hippocratis*, and several Machines of this Kind, which you will find in the Works of the principal Surgeons, such as ORIBASIUS, PARÆUS, ANDREAS A CRUCE, SCULTETUS, and others. But if we attend to the Observations of several modern Surgeons, which are made with great Accuracy, we shall find that Machines of this Kind do not act sufficiently equal in all Parts at the same Time, and that you will find great Difficulty in applying them: Besides, they are not always at hand in Times of War, and upon many other Occasions. Therefore it is no Wonder that you scarce ever see or hear of these Instruments amongst the Surgeons of the present Times; especially since you will always find your Hands or the Napkin sufficient for any Extension that can be required.

What is to
be done
where you
have Tumor
and Inflam-
mation.

XXIII. There remains one Observation to be made with relation to the Extension of the Limb. When the Surgeon is called at some Distance of Time from the Accident, when a Tumor and Inflammation are come on, it is best to defer the Extension of the Parts till these Symptoms are removed. For it is impossible to make a proper Extension whilst the Parts are affected in this Manner, without bringing on the most acute Pains, Convulsions, and Danger of Sphacelus. But if the Symptoms of this Kind appear but in a small Degree, it is better to attempt the Extension of the Parts instantly, before the Inflammation encreases.

How the In-
flammation
is to be
treated.

XXIV. Where the Inflammation is already arrived at so great a Height as to forbid the Extension of the Parts, the Surgeon's principal Care should be directed to assuage this Symptom. The same Methods which we proposed for dispersing Contusions, (*Chap. XV, B. I, N. X, &c.*) Blood-letting, loosening the Bowels, advising the Patient to drink large Quantities of aqueous Fluids, prescribing such internal Medicines as are known to abate Inflammations, and fomenting the Parts with warm dispersing Fomentations, will answer this Intention. These Applications will usually remove the Inflammation in four and twenty Hours, in such a Manner that you may safely undertake the Extension of the Limb. Instead of the foregoing Fomentations you may use the following, which very powerfully answers the Intention it is prescribed for. *R. Herb. Scordii Mij, vel iij. Aq. simplicis ℥j. Spiritus Vini ℥vij. quæ simul per Horæ quadrantem probè decoct. admixtisque Salis Culinaris ℥j. it. Nitri ℥ss identidem cum Linimentis calidè supra fractum membrum deligentur.* Where the Inflammation is so violent, that it will not yield sufficiently in the Time abovementioned, to admit of the Extension of the Limb, and the Patient is plethoric, you must open a Vein, and repeat these Applications till they take Place, and the Symptoms disappear.

Of Splinters.

XXV. Sometimes you will be troubled with Splinters of the Bone in your Way, which vellicate and prick the neighbouring Part, and will render the Reduction of the Bone very difficult. If the Splinters are free, and have no Connection to the Bone, you must remove them carefully: If they hang by a Por-
tion

tion of the Periosteum, divide them with your Scissors, for you will never find that they will easily unite again with the rest of the Bone, but will always give you great Uneasiness and Trouble in your Cure. If the Splinters adhere to the neighbouring Parts, and do not much impede the Reduction of the Bone, it will be best to replace the Bone, and to leave the Splinters either to loosen and come away by the Suppuration of the Parts, when they may be taken out without giving the Patient great Pain; or sometimes they will grow again to the rest of the Bone. When they adhere very firmly to the principal Parts of the Bone, we should be so far from attempting to extract them by Force, that we should endeavour to replace them with the greatest Exactness. When this is performed with Accuracy, they will frequently unite to the rest of the Bones. But where that is not to be expected, we must get them out by Degrees in the best Manner we can.

XXVI. Where Points of the broken Bones or Splinters stick so far out, that they are an Hindrance to the Reduction of the Bone, you should diligently consider whether you can by any Means contrive their Reunion to the Bone; which you may judge of, by observing at what Distance they are removed from some large Bone, and whether there is a large Quantity of Flesh intervening. Where they cannot be reduced or reunited to the Bone, they may be removed by a pair of strong pointed Forceps, *See Plate VIII, Fig. 1.* or if they stick very firm you may use a fine Saw, *Plate VII, Fig. 9.* When you have removed the Splinters, you are in the next Place to make your Extension, and reduce the Bone; till they are removed, the Reduction and Reunion of the Bone are generally impracticable.

Of Splinters
sticking
through the
Flesh.

XXVII. If the Splinters are concealed under the Skin, and you cannot lay hold on them with your Hands, you must first try if you can reduce them to their natural Situation. If this cannot be done, make an Incision through the Skin, and take them out.

Of Splinters
that are con-
cealed under
the Skin.

XXVIII. To make a proper Extension of the Limb, two Assistants should be employed, in the Manner we described above at N. XXI. and the Surgeon should take hold of the extended Part, and direct it with his Hands, sometimes a little outwards, sometimes a little inwards; now upwards, then downwards; putting it into different Positions, as the Circumstances of the Case shall require, till the Parts have recovered their natural Situation.

Of Exten-
sion.

XXIX. You may know that the Bones have regained their natural Situation, by the Remission or Absence of Pain, and by observing that the fractured Limb is of the same Figure and Length with the sound Limb. If these Signs of Recovery are wanting, you have good Reason to suppose that the Operation is as yet ineffectual, and the Extension is to be repeated or continued in the Manner we have described, till the Bone is replaced.

How to dis-
cover when
the broken
Bones are re-
placed.

XXX. The Bones being properly replaced, the next Thing to be done is to secure them in their Situation, that they may unite to the best Advantage.

They are to
be kept in
that Situa-
tion.

XXXI. Two Things are chiefly required to answer this End. 1. To bind it up properly: And, 2. To lay the Limb in a convenient Posture. The Apparatus for securing the Situation of the Limb is composed of *Bandages, Bolsters, and Splints*^a,

How Frac-
tures are to
be bound up.

^a The famous PETIT of Paris forbids the Use of *Splints*, and supplies their Place with *Bolsters*, which I think will by no Means answer.

which are to be made of thick Paper, of Wood, or, if the Surgeon shall think proper, of thin Plates of Copper, Brass, Steel, Tin, or Lead. *See Plate VIII, Fig. 7.* But I think the best are those made of Wood or Paper. The Manner of Dressing the Limb is as follows: In the first Place a Roller is to be passed round the fractured Limb; upon this are to be placed Bolsters, and over them Splints, which are to be secured by a tight Bandage over all. In some Cases other Instruments are necessary, such as Boxes made of Paste-board, Wood, or Metal, to fix the fractured Limb in. *See Plate IX, Fig. 9.* Other Instruments are also necessary in this Case: The particular Manner of applying which, to the Arms, Legs, and other Parts, we shall describe below, when we treat particularly of Fractures; and there you will find that simple and compound Fractures require different Bandages. This Apparatus of Instruments is required only to secure the Bones in their Situation, and to forward their Union. It is no Wonder therefore that Fractures are ill cured, where the Surgeon is ignorant of the proper Methods of applying the Bandage, or the Patient is unruly, and will not give the Limb proper Rest.

The Use of
Plasters in
this Case.

XXXII. Although great Numbers of Surgeons at this Time make it their constant Practice to apply a Plaster to the fractured Part of the Limb before they make the Bandage, yet the most prudent and skilful Surgeons amongst the Moderns entirely reject Applications of this kind, as not only useless, but injurious to the Patient. For these Plasters can do no Service without the Bandage; but the Bandage alone, if it is dextrously made, is sufficient to keep the Limb firm: And the Plaster carries this Inconvenience with it, that it stops up the Pores of the Skin, and produces Tumors, and most violent Itchings. For my own Part, I am entirely of Opinion, that all Kinds of Fractures may be very happily cured without the Use of Plasters, and I am confirmed in this Opinion by long Experience. But if, notwithstanding this, any one should be bigoted to the Use of Plasters, I would advise him to be cautious not to make them of too great Length: They should not entirely surround the Limb; but a Thumb's Breadth of it at least should be left bare, lest the Blood should be obstructed in its Course, which would bring on Tumors, Gangrene, and Spachelus.

Of the Dressings.

XXXIII. Before we treat more particularly of Fractures, it will be proper to say something briefly of the Apparatus of Dressings required in Cases of this Kind: And since the chief Help seems to be expected from *Bandages*, we should principally contrive that besides having the general Properties of a due Length and Breadth, they should also be accurately adapted to the Shape of the broken Limb. In Fractures that are not attended with a Wound, you should apply two single-headed Bandages, each of which should take its Beginning upon the injured Part; one ascending, when it has gone thrice round the Limb, and the other descending in a contrary Direction, and then ascending again. The same Windings and Circumvolutions may be made with a single Bandage, if it be long enough; as will appear from our Treatise of Bandages.

The Bandage should be neither too tight nor too loose.

XXXIV. In order to keep the Parts in their natural Situation, the Bandage should be made pretty firm: But if you tighten it too much, you will interrupt the Circulation of the Blood, and excite Tumors, Inflammation, and Gangrene. On the other hand, if the Bandage is made too loose, it will easily come off, and set the disunited Parts at Liberty: The middle Way therefore is most eligible. You will discover the Mean between these two Extremities by observing a slight

a slight Degree of Tumor below the Bandage, after it has been applied for some Time. If the Tumor encreases to a violent Degree, you must loosen the Bandage: If the Parts do not enlarge at all, you must bind it still tighter.

XXXV. *Bolsters* and *Splints* are to be prepared in proportion to the Size of the fractured Limb: Where the Limb is of an unequal Size in different Parts of it, you must fold up the Bolsters in the Manner we have described at *Plate IX. Fig. 13.* You will by this Means be able to apply the Splints to greater Advantage. The Splints should be tied on with three Tapes, the Middle of which is to be fastened first, and then the others. Of Bolsters and Splints.

XXXVI. In Fractures of the lower Arm, after you have applied your Dressings and Bandage, you may suspend it in a *Scarf* or *Sling* (by the *French* called *Escarpe*) which is to hang from the Neck. See *Plate XXXVIII, Fig. 17.* In Fractures of the Leg you may rest the Limb upon Pillows, *Plate IX, Fig. 5.* or in Boxes, *Plate IX, Fig. 9.* placing Cushions or Pillows under it. These Machines also are to be fastened to the Limb with Tapes, that it may remain fixed and immoveable. Some Surgeons fasten a Pillow under the Limb, after the Application of the Bandage, in Imitation of *SOLINGIUS.* See the *Amsterdam Edition, printed in 1698, Plate XV, Fig. 9.* Others use wooden Boxes, such as you will find described by *SOLINGIUS* and *SCULTETUS.* But the most prudent Surgeons prefer Cushions or Pillows: For this is not only more useful than any other Method, but it is also very handy and easy to come at. We use in this Place a sort of a *Sole, Fig. 6.* made of thick Paper or Wood, which keeps the Foot steady. This should be lined with a soft Bolster, to keep it from galling or fretting the Foot. See *Fig. 7:* It is to be fastened to the Pillows by the Tapes *a a a, Fig. 6.* A Piece of Linen, in the Shape of a Ring, is to be sewed to the lower Part of this Bolster, and fastened on with the Strings, *b b, Fig. 8.* This is a Contrivance to suspend the Heel, to prevent Inflammation, Pain, and other Mischiefs that are frequently brought on by lying upon it too long. The two-headed Bandage has its Use in this Case; for the Heel may be put into this, and the two Heads of it being sewed to it, will be kept fast on. The two Heads of the Bandage are to be placed one under the internal, and the other under the external *Malleolus*, to prevent too great Stricture upon the *Tendo Achillis*, which would bring on acute Pains and Inflammations. You may make an Arch over the Foot with a Piece of Hoop, which will keep the Bed-cloaths from being troublesome, and at the same Time not prevent the Application of warm Napkins, or Fomentations to the Part. See *Plate IX, Fig. 10.*

XXXVII. The Patient should lie upon his Back, with his Head and the fractured Limb somewhat higher than the rest of his Body: He should have a Rope with a Handle at the End of it hung from his Bed's Tester, that he may be able to take hold of it, and raise himself up when there is Occasion. If he is of a plethoric Habit of Body, you will do well to bleed him in the Arm, to prevent Inflammation. The Surgeon should be very frequent in his Visits at the Beginning of this Disorder, and very diligent in examining whether the Bandage, and other Applications, remain sufficiently firm or not. If any thing is out of Order, he is to correct it, the Regimen with regard to Diet should be the same which we advised above, when we treated of Wounds. See *Chap. I. § XLIII. and the following.* He must not attempt to rise on any Account, but be supplied with Bed-pans, &c. How the Patient is to be treated.

XXXVIII. The

When the
Dressings are
to be opened.

XXXVIII. The first Dressings should be opened and renewed sooner or later, in proportion to the Nature and Number of the Symptoms that accompany the Fracture. When the Bandage remains sufficiently tight, and no bad Symptom appears, you should not loosen it, till the fifth or eighth Day. But where you have Inflammations, Tumors, Pains, and violent Itchings; or where the Bandage is too loose or too tight, which is frequently the Case, you must instantly take off the Dressings, and change them. The second and third Dressings must be performed in the same Manner with the first; with this only Difference, That at the third Dressing, if you perceive no Tumor, you may make the Bandage tighter than before, and by this Means prevent the luxurious Growth of the Callus, which would occasion Deformity.

Cure of Fissures.

XXXIX. When you have Reason to judge, by the Symptoms related above at N. III, and V, that your Case is a *Fissure*, you may follow FELIX WURTZIUS's Instructions upon the Head. He always laid his ^a Plaster, which he made use of in Fractures, upon the disordered Part, and upon that he placed Splints, and advised the Patient to rest for some Days, and the Tumor will quickly disappear. When you find the Tumor advanced in Size, and soft, it is a plain Indication that it contains a Fluid, which is to be let out by Incision. When you have evacuated the corrupted Fluids, you should put a Tent into the Wound, dipt in the *Ungentum Fuscum Wurtzii*, using afterwards the Bandage which is applied to Fractures accompanied with a Wound. If we listen to WURTZIUS, Ointments, Cataplasms, Fomentations, and Baths, are of no Service in this Case, but are prejudicial. For collected Fluids putrifying, corrupt the neighbouring Parts, and the Bones, and bring on Caries, and other grievous Disorders. The Symptoms that arise from Fissures are frequently attributed to Defluxions, or to the Gout. Whoever desires to be more fully informed of the Nature of this Case, I would advise him to consult WURTZIUS, *Part II. Cap. xxviii. pag. 381. edit. Basil. ann. 1687.* GOUVEIUS asserts, that Fissures, when they are just made, may be cured by the Application of Bandages without the Assistance of other Remedies. See *Veritable Chirurgie*, pag. 86.

CH A P. II.

Of DISORDERS accompanying FRACTURES.

Of a Fracture accompanied with a Wound.

IF a Fracture is accompanied with a Wound, after you have reduced the fractured Bones, you must treat the Wound in the same Manner with other lacerated Wounds. First, the Wound is to be well cleansed with warm Wine, Spirits of Wine, or salt Water; in the next Place, it is to be filled with dry Lint, to stop the Hæmorrhage; then to be dressed with digestive Ointment ^b; lastly,

^a The Plaster is made in the following Manner: *Rx. Resinæ pur. ℥ candidæ lbii. Terebinthin. Vulg. lbss. leni igne liquefiant, injectoque demum Radic. Ulmarie Pulv. 3 iv. tantisper bene subigantur, donec modicè frigeant.* When you have a mind to spread it upon Linen or Leather, throw it into hot Water. The Author is very high in his Commendation of this Plaster at pag. 320. of his Surgery.

^b If any Hæmorrhage should happen, you must observe the Methods we described when we were treating of Wounds.

it is to be anointed with some vulnerary Balsam till it is thoroughly healed. Since it is necessary to open the Dressings every Day, in order to cleanse the Wound, but at the same Time it would be of very bad Consequence to move the Limb, therefore a great Length of Bandage in this Case would be very wrong, especially in the *Femur* or *Tibia*: For it would be troublesome to lift the Foot up to roll on a long Bandage, which would disturb the fractured Bones, and throw them out of their natural Situation. For this Reason the best Surgeons neglect the Use of long Bandages in this Case, and apply the Bandage of eighteen Heads, *Plate IX, Fig. 4.* which may be loosened at Pleasure. When the Wound is healed, which happens frequently before the Bones are united, you should lay aside the Bandage of eighteen Heads, and bind up the Limb with long narrow Rollers till the Cure is thoroughly perfected. But we shall explain this more largely below, when we come to treat professedly of Bandages.

II. When a Fracture is attended with an Ulcer without a Caries, which frequently happens in the Leg or Thigh; it is to be dressed every Day, after the same Manner as we directed for a Wound in the same Circumstances: Having first replaced the Bone, the Limb is to be bound up with the Bandage of eighteen Heads, till the Ulcer is healed. But when the Ulcer is healed, and the fractured Parts of the Bone not sufficiently united, you must lay aside the Use of the eighteen-headed Bandage, and apply long narrow Rollers, as we advised above for a Fracture attended with a Wound.

III. Sometimes the Fracture happens upon a Part that has been long troubled with an Ulcer and Caries; this Case is very difficult of Cure, nay frequently it admits of no Cure at all. Very few Writers in Surgery have laid down any Directions, by which we may be guided in this Case. PETIT indeed describes the Case of a *fractured Tibia attended with a Caries*: But as he has related the Case of the Tibia alone, neglecting to describe it as happening to other Parts, he has in my Opinion, by no means satisfied the Subject. However, this may serve as an Example to be imitated in similar Cases, till we shall be furnished with more perfect ones. A young Man, who had been for some time troubled with an Ulcer and Caries, about the Middle of the Tibia, had the Misfortune to break the Bone in the very Part, the Fibula remaining at the same time whole; therefore no Extension was required in the Cure of this Fracture. PETIT, in the first place, took off all the vitiated Flesh that was situated near the fractured Part, with his Knife, and reduced the Ends of the Bone into their proper Situation with his Fingers, and then filled up the Ulcer with dry Lint, and covered all with the eighteen-headed Bandage, as above. After some Days, when the Fever was quieted, he cauterised the Extremities of the fractured Bone that were affected with Caries, and afterwards took off the carious Parts with the Trepan, which the *French* call *Trepan exfoliatif*: Having done this, he applied Lint to the naked Bone, well saturated *cum Tinctura Aloës*. But he dressed the fleshy Parts first *cum Unguento digestivo*, and afterwards *cum Unguento fusco*, to keep down the Luxuriancy of the hard Flesh, which is very prejudicial in this Case: And this Method of dressing he continued for fifty Days, till the disordered Parts of the Bone separated from the sound. He then began to encourage the Growth of new Flesh, by applying vulnerary Balsams, and healed both the Bone and Ulcer after the usual Method.

IV. But

A fractured
Thigh with
a Caries.

IV. But the Case is attended with far greater Difficulties when the Fracture happens upon an ulcerated Part, attended with ^a Caries in the Thigh; which Case I find entirely neglected in PETIT's Book of Fractures. I knew a Student of about twenty Years of Age, who had been troubled for many Years with an Ulcer and Caries, in the Middle and internal Part of his Thigh, near the Situation of the crural Artery. The Flesh in this Part was so thick, that the Caries did not appear, and the Vicinity of the great Artery prevented us from enlarging the Ulcer with the Knife, or from cauterising the Bone, so that all the Medicines which were applied had no Effect: At length, as he was walking about, the Thigh broke in this disordered Part, without the Assistance of any external Force. What should we do now? we were prevented from enlarging the Wound, or cauterising the Bone, by the Reasons I just mentioned: And though we replaced the Bone, and applied a proper Bandage, yet it would never unite, but the Patient dragged on a miserable Life. Therefore it is worth our serious Consideration, what is the best Method of Cure for Fractures of this Kind when they happen in the Thigh, Arm, or other Parts where the Bones lie concealed and cannot be laid bare with Safety. But this is rather to be wished for than expected.

Of the Cal-
lus.

V. The Surgeon has done his Duty in the Treatment of a Fracture, when he has diligently replaced the Bones, and taken Care to preserve them in that Situation. For Nature has provided for the rest, by supplying the divided Parts with a Callus; a Sort of Gelly or liquid viscous Matter, that sweats out from the small Arteries and bony Fibres of the divided Parts, and fills up the Chinks or Cavities between them: This first appears glewy, then of a cartilaginous Substance, but at length becomes quite bony, and joins the fractured Parts so firmly together, that the Limb will often make greater Resistance to any external Violence with this Part, than with those which were never broken, in the same Manner as we frequently see it happens to Pieces of Wood well glewed.

Its Growth.

VI. But as the new Flesh in Wounds will frequently sprout up too fast, so will the Callus in Fractures, and by this Means render the Limb uneven and deformed, especially in Fractures attended with a Wound. Where this is the Case, and you see plainly that you cannot prevent it, you had best inform your Patient of it in Time, lest he should blame his Surgeon as the Author of his Deformity. For it cannot always be prevented or remedied; nor can you take off the Luxuriancy of a Callus as you can of the Flesh, for several Reasons of Consequence: Therefore when once it is formed it remains without Cure.

How to pre-
vent the Lu-
xuriancy of
the Callus.

VII. But some Measures may be taken to prevent the Callus from exceeding its due Bounds, by making the Bandage somewhat tighter than ordinary, and wetting it first with the best rectified Spirits of Wine. This will not only keep the viscous Matter within its Bounds, but will also forward its Induration. Which may be observed in the Tibiæ of Men and the Arms of Women, as those Parts are more frequently exposed to View. But in Fractures attended with a Wound, as they will not admit of too tight a Stricture; especially if you use the eighteen-headed Bandage, it is extreme difficult to prevent a Luxuriancy of Callus. When once the Callus is indurated, we have no Medicine that will take it down or destroy it. Nevertheless, there are some who pretend that it is

^a Lib. De Morb. Off. Tom. II. p. 270, &c.

to be dispersed by the *Emplastrum de ranis Vigon. cum Mercurio*, tying a Plate of Lead over it. The Callus grows sometimes faster, sometimes slower, according to the Size of the fractured Bone, the Habit of the Patient's Body, the Temperament of the Air; and lastly, in Proportion to the Patient's Age. When it comes on but slowly, some Surgeons place great Confidence in the Patient's taking *Osteocolla*, half a Drachm at a Dose.

VIII. Violent Itching is best prevented by removing oily fat Remedies, and therefore the Plasters themselves, from the Limb: For they are composed of such Particles that they stop up the insensible Pores of the Skin. If the Itching remains after the Removal of these Applications, you may wash the Part with warm Wine, Oxycrate, or Spirit of Wine, covering it up with soft, fine Linnen. If Blisters rise upon the Part, they should be snipt with the Scissors.

To prevent violent Itching.

IX. Inflammations are to be treated in the Manner we advised above in *Book I. Chap. XV.* But to remove Pains and Convulsions, you should diligently attend to what we laid down in describing the Cure of Wounds: But above all, you should be very accurate in replacing the fractured Bones, and in observing whether they maintain the Situation which you restored them to; and if you observe any Splinters quite free from the neighbouring Parts, you should instantly remove them, and endeavour to lay the Limb in an easy Posture. In these Circumstances you should not neglect to open a Vein, and to apply emollient and dispersing Cataplasms and Fomentations, prescribing at the same time Medicines to be given internally with this Intention, and advising the Patient to observe a proper Regimen with regard to his Diet. Without observing these Rules, violent Inflammations, Sphacelus, and Death itself will frequently ensue.

Of Inflammation, Pain, and Convulsion.

X. If the Inflammation is so violent as to threaten a *Gangrene* of the Part, you must bleed instantly, lay aside the long narrow Bandages, and apply the Bandage of eighteen Heads, use Fomentations prepared *ex Aquâ Calcis & Spiritu Vini Camphorato cum Essentiâ Aloes & Myrrhæ; vel ex Spiritu Vini Camphorato & Sale Ammoniaco*, or the Remedies we recommended above, treating of Fractures, *C. I. N. XXIV.* and in the Chapter on *Contusions*. But if the Part is already affected with *Gangrene*, you must make frequent and deep Scarifications, to set the stagnating Fluids at Liberty, not neglecting at the same time to apply externally the Fomentations we recommended above, and to give the Bark inwardly. When the *Gangrene* has penetrated so deep into the Parts, that it is beyond the Reach of Fomentations, and begins to be sphacelated, you must take off the Limb, to save the Life of the Patient.

How a Gangrene is to be treated.

XI. If the Fracture is attended with a considerable Discharge of Blood, you should diligently examine whether the Hæmorrhage proceeds from a Vein or an Artery. Whether the Flux of Blood is to be stopped by Pressure, by the Help of dry Lint, Bolsters, and Bandages; or by styptic Medicines, or by making a Ligature upon the injured Vessels; or lastly, by the actual Cautey, as we have taught above *Chap. II. on the Cure of Wounds*. After the Blood is stopped, the Bones are to be replaced, extraneous Bodies are to be removed, and the Limb bound up.

Of Hæmorrhage.

XII. If a Relaxation of the Nerves, or Wasting of the Limb, succeed a Fracture, there are very little Hopes of help. However it will be adviseable, (1) To rub the Limb well with hot Cloths; (2) With spirituous Medicines, such as

Of Palsy and Wasting of the Limb.

Spirit.

Spirit. Formicar. Lubricor. Matricalis, C. C. Sal Ammoniac, Essentia Euphorbii, Castor, and others. (3) To foment the Limb with warm Fomentations and Baths made *ex Vino Herbisque corroborantibus, Aromaticis ac Nervinis, vel Thermis naturalibus.* (4) Lastly, the best Remedy, in my Opinion, is, to wrap the tabid Limb up in the Skin of an Animal that is just killed, and remains in its natural Heat: For by this Means the Flux of the Blood and nervous Juices to the Part, is very much excited: And more particularly so when you prescribe at the same time nervous and strengthening Medicines to be given internally.

Stiffness of
the Joint.

XIII. When the Joint is become rigid and inflexible, which Disorder the Greeks call an *Anchylosis*, if it is occasioned by a Discharge of the Juices of the broken Bone into the Joint, which concretes there instead of forming a Callus in the fractured Part, this Case will turn out very difficult to cure. But if this Disorder is occasioned by having kept the Joint for a long Time without Action, or from a Concretion of the Juices that are secreted in these Parts to make them slippery and easy to move; it will be very proper to foment the rigid Part with emollient Fomentations and Baths; to rub it frequently with Oils and Fat of Animals, or with emollient Ointments; and to move it backwards and forwards frequently with your Hands, till it shall recover its natural Faculty of moving^a.

Fracture
with Dislo-
cation.

XIV. You have frequently a Dislocation as well as Fracture of the Bone, in one and the same Limb. When this is the Case, the Luxation must be remedied in the first Place; and then the fractured Parts may be restored to their natural Situation: Each of them must be dressed with a proper Bandage. Sometimes the Fracture happens so near the Head or Articulation of the Bone, that it is impossible to fix your Hands or Instruments to make a proper Extension. In this Case, the Fracture is first to be attended to; which must be cured, before you can attempt to remedy the Luxation: Though you should be very careful, during the Cure of the Fracture, to foment the luxated Limb *cum Spiritu Vini, vel solo, vel camphorato, vel & aceto calefacto.* This Method may keep the Part free from Inflammation and Tumor. I will not pretend to affirm, that this Method of Cure is always to be depended upon: For it frequently happens that the luxated Parts are to be reduced by no Art. But as this is the only probable Method of relieving the Patient, and as there are frequent Instances of its being attended with Success, even where the Luxation has been of some Months, or even a Year's standing, I think it ought by no Means to be rejected^b.

In what
Manner
Limbs are to
be broken
again, when
they have
been ill set.

XV. If a fractured Limb appears crooked and deformed after the Cure has been performed, which Accident happens either from the Negligence of the Surgeon, or from the imprudent and restless Behaviour of the Patient; I know of no other probable Method of restoring the Limb to its former Shape and Beauty, than by making a strong Extension of it, and breaking it in the Part where it is just united: By this Means the Parts may be replaced in a more proper Manner. Great Care and Circumspection is required in the Treatment of the second Fracture. When the Deformity complained of is but small, and the Callus intirely indurated, or where the Patient is in Years and infirm, I should not advise this Method of Cure to be attempted; since it is not only attended with great Pain, but with great Danger also. On the other hand, when the Callus is tender, and the Patient young and vigorous, I think this Operation

For the Cure of an *Anchylosis* see LE DRAN, *Obs.* 93, 94. and BOERHAAVE's *Aph. Pract.* N. 556.
^a See PETIT, on *Diseases of the Bones.*

may be fairly attempted. In the mean Time, it is necessary to observe here, that before you undertake this Cure, you must endeavour to soften the Callus, by using emollient Baths, Fomentations, and Ointments, for several Days.

C H A P. III.

Of FRACTURES in particular.

I. **S**INCE we have already treated of Fractures of the Bones in general, it remains now that we speak to particular Fractures. And first, in this Chapter, we shall treat of those that happen in the Head. We spoke largely enough above in *Chap. XIV.* of Fractures of the Cranium: Therefore we shall now proceed to describe other Kinds of Fractures.

The Connection and Argument of this Chapter.

FRACTURE of the NOSE.

II. In the Nose, both Bone and Cartilage are the Subjects of Fracture, which happen sometimes on either Side; sometimes in the Middle, chiefly by a Blow or Fall: This is easily to be distinguished by the Sight or Touch. If either of the Bones in the Front of the Nose are fractured, it produces a Flatness in the Nose, and the Air meets with Obstructions in its Passages through the Nostrils. If the Bone on either Side is fractured, the Part becomes hollow: When the Cartilage is disturbed, the Nose inclines too much to one Side. See *CELSUS upon this Head, Lib. VIII, Cap. 5.* Sometimes the Fracture happens without a Wound, but is much oftner attended with a Wound of the common Integument. See *SAVIARD, Obs. 107.* If the Injury of the Nose is very violent, the Fracture cannot be so perfectly cured, but some Deformity will still remain. The Vicinity of this Part to the Brain, which is frequently injured at the same Time, renders Cases of this Kind frequently very dangerous. A *Caries* also, *Ozæna*, and *Polypus*, are no uncommon Attendants upon this Disorder: By which Means the Sense of Smelling, the Faculty of Speech, and the Actions of Inspiration and Expiration, are very much disturbed.

Fracture of the Nose.

III. In order to restore the fractured Bones of the Nose to their natural Situation, the Patient is to be placed in a Seat opposite to the Light, and his Head held back by an Assistant. The Surgeon is to raise the depressed Parts with a Spatula, Probe, or a Quill, applying externally the Thumb of one Hand, and the Fore-Finger of the other. If the Bones of the Nose are fractured on both Sides, they are to be raised on each Side after this Manner, and the Cavity of the Nostrils is to be filled up with long Dossils to prevent the Bones from collapsing; covering the Part also, for this End, with some Plaster, having first applied such Dressings as are ordinarily used to recent Wounds. If the Bone is fractured into several Splinters, they are to be forced into their proper Places by the Fingers; but if a Splinter is so entirely separated from the Bone, that it will not easily unite with it again, you must remove it with your Forceps.

After what Manner Bones of the Nose are to be replaced.

IV. When the Fracture of this Part is accompanied with an external Wound, after you have replaced the Bones, you should dress the Wound (at first) with dry Lint, covering it with a vulnerary Plaster: Afterwards you must use balsamic Medicines; such as *Ung. Digestiv. Essent. Aloes, Myrrhæ, Succin. Mastick.* All greasy and oily Medicines are to be diligently avoided here, and in all

How a Fracture with a Wound should be treated, and Bandage be performed.

other Cases where the Bone is injured; because they are very hurtful in these Cases. But where you have no external Wound, it will be sufficient to apply a sticking Plaster to the Part, to secure the Bones in their Situation: And by this Means you will find they will unite in about fourteen Days; if no Abscess or Caries supervene. If the Bone should require a stronger Support than what we have hitherto mentioned, you may make one of single or double Cap-Paper, which may be adapted to each Side of the Nose, and supported with Bolsters. See Plate VIII, Fig. 8. The whole must be supported with a Bandage of four Heads, which must not be bound on too tight; which will appear to you more clearly, when you consult what we shall say below, where we are to treat professedly of Bandages. Before the Plasters and Bandages are applied, some introduce a Silver or Leaden Pipe, or Quill, into each Nostril, to render the Faculty of Breathing easier. See Plate II, Lett. P and Q. In order to secure these Pipes and the Bones of the Nose in their proper Situation, they use the four-headed Bandage. Some amongst the modern Surgeons intirely reject the Use of all this Apparatus, except the Bolsters, Bandage, and Plaster; for they are of Opinion that it does more Harm than Good, and that the Introduction of Pipes, or even Tents, into the Nostrils, will occasion so great a Degree of Irritation, and such a Difficulty of Breathing, as is not to be borne: Besides, when once the Bones of the Part are properly replaced, they are not so easily disturbed as is commonly imagined. In these and all other Cases, where there is no Necessity for a more laborious and complicated Treatment, the simplest and easiest Method of Cure is always to be preferred.

C H A P. IV.

Of a FRACTURE of the JAW.

Of a Frac-
ture of the
Jaw.

I. **T**HOUGH both Jaws are liable to Fractures, the upper is less so than the lower; and even that, than the rest of the Bones. When they happen in the upper Jaw, the divided Parts must be replaced, as near as possible; and then covered with a Plaster, as in the Nose. When in the lower Jaw, it is broke either on one Side or on both; and the divided Parts in this Case do not recede any considerable Distance from each other; for the Muscles of this Part are so situated, that the Bones are not much separated from each other by their Action. But the Degree of Injury depends upon the Violence of the Blow received.

By what
Signs a Frac-
ture of the
Jaw is
known.

II. That Kind of Fracture in this Part is soonest discovered, where the Bones are separated from each other. For not only your Eye, and often your Ear, but especially the Touch, will speedily and evidently demonstrate what is displaced in the Jaw; and whether the natural Position of the Teeth be disturbed. Besides which, the Patient's suffering violent Pains, and sometimes Convulsions, is usually a pretty certain Sign that the Jaw is fractured: But if the Pieces of the Bone are not separated, the Fracture is discovered with much more Difficulty.

How the
Bones of the
Jaw are to
be set or re-
placed.

III. A Fracture of the Jaw being thus discovered, our next Intention is to restore the broken Bones to their proper and natural Position. The Patient is therefore to be commodiously seated against the Light, and his Head to be held firm.

firm by an Assistant. The Surgeon is then to introduce his Thumb or Fore-Finger of one Hand into his Mouth, applying his other Hand externally: And by this Means he is to press the Fragments of the Jaw on each Side, till they have regained their former Situation; which may be known by the regular Disposition of the Teeth. But if any of the Teeth be found loose or slipped out, it may not be improper, if nothing hinders, to restore them afterwards to their Places^a, and to fasten them by Gold or Silver Wire, or with Cerate, to such as are next them: For by this Means they have been frequently held firm. If the Jaw should happen to be broke on both Sides, they must be restored one after the other by the same Method as before. But then the Operation is usually more or less successful in proportion to the Surgeon's Skill in the Anatomy of this Part. If there should be a Piece not moved out of its Place, there will be no Occasion to restore it.

IV. After the Bones are properly reduced; they must be covered with, first, a Plaster, and then a Compress, dipped in *Sp. Vini*, and applied internally; and another Compress, sewed to a Piece of Paste-board in the Form of a half Jaw, is to be laid on externally. See *Fig. 9. Tab. VIII.* These are to be kept on by the Bandage with four Heads, perforated in the Middle, to let in the Chin; or else it must be very carefully bound up with the particular Bandage for this Case, which we shall describe when we come to treat professedly of Bandages. But whenever the Jaw is found to be fractured on both Sides, it is usual to introduce and apply internally, after the Compress dipped in *Sp. Vini*, another made of thin Paste-board, perforated in its Middle, and accommodated to the Figure of the Chin, as at *Fig. 10.* In this Manner its Middle (*a*) that is perforated, is to be applied to the Chin; and its two Extremities (*b b*) toward the Ears. But Fractures of this Part may be well enough cured without Plasters and Splints, where we can commodiously apply a Bandage: For the Bones are not very easily displaced, when they are once reduced. In what manner this Part is to be bound up, we shall make pretty evident, when we come to treat of Bandages in particular.

What is to be done after the Jaw Bone is set.

V. To forward the Agglutination of the fractured Jaw, after Phlebotomy, the Patient should be reconciled to rest as much as possible; but above all he should strenuously avoid, particularly for the first Days, all Talk and Eating. It seems therefore to be much the safest Way to live upon, till the Jaw is grown firm, only fluid Aliments, such as Broths and Soops, poached Eggs, Gellies, and the like, taking Care not to lie on the Back, and strictly to avoid turning on the Face, or either Cheek. By which Means the Fracture will be well in about twenty or thirty Days: Especially if the internal Parts of the Mouth that are injured, be frequently moistened with a little *Mel Rosarum*.

How the Patient should behave himself under the Cure.

VI. If the Fracture be attended with a Wound, it must be undone every Day, and treated as we have taught in *Chap. IV, N. VI.* till it be healed. An Example of a Fracture in both Jaws may be seen in *LE DRAN, Obs. Chirurg. 3. Tom. I.* but of the lower Jaw only, in *Obs. 8.*

^a GOUVEUS indeed, dissuades us from this Method, thinking that the Bones will by this Means be again displaced; but TURNER, (and some others) in his *Surgery*, gives an Instance where it succeeded; and so does *LE DRAN, Obs. 3. Tom. I.*

C H A P. V.

Of a FRACTURE of the CLAVICLES, STERNUM, and HUMERUS.

Of a fractured Clavicle,

I. **T**HE Clavicle^a is extremely subject to be fractured both from its transverse Position, and from its Smallness; which happens either in its Middle, near the *Humerus*, or near the *Sternum*. But in which-ever of these Parts it is broke, that End next the *Humerus* always descends lower than the other, next the *Sternum*; from the Weight of the Arm, which was before sustained by the Clavicle and Head of the *Sternum*. And notwithstanding that Part of it next the *Sternum* remains immoveable, by the Descent of its other End, it can scarce happen but they will, in some Measure, collapse one over the other.

How a Fracture of the Clavicle is to be discovered.

II. It is no great Difficulty to know when this Part is fractured. For (1) it will be hardly possible for the Patient to lift up his Arm: (2) His Arm will hang inclining towards his Breast, whereas before it was straight, or tended rather backward: (3) And lastly, as the Clavicles are covered with scarce any Muscles, the Fracture will be greatly evident both to the Touch, the Eye, and the Ear; especially upon any small Motion of the Part.

The Prognosis of a fractured Clavicle.

III. When the neighbouring Parts are not affected, this Fracture is attended with no bad Consequences: But if the adjacent Veins or Arteries, or even Nerves are injured, there is generally great Danger. The Reduction of a broken Clavicle is not very hard to be effected, especially when the Fracture is transverse: Nor is it usual for the *Humerus*, with the Fragment of the Clavicle, to be so far distorted as not to be easily replaced with the Fingers. But the Difficulty is much greater to keep the Bone in its Place, when the Fracture is once reduced, especially if the Bone was broken obliquely. For which there are two Reasons: *viz.* the circular Bandages, with which the Bones of the Arms and other Extremities are usually held very firm, cannot be applied here, by reason of the Form and Situation of the disordered Part: And then the Weight of the depending Arm itself, soon pulls asunder what the Surgeon has been replacing. It is no wonder, therefore, if the Juncture of the Clavicle be often found either uneven or unfirm after its Agglutination. Yet we do not want Examples where fractured Clavicles have been very happily and firmly cured, especially when the Patient keeps himself quite free from Motion.

How the broken Clavicle is to be reduced.

IV. A Fracture of the Clavicle is to be reduced in the following Manner. The Patient must be placed on a low Seat, and an Assistant is to thrust his Knee against the Middle of the Patient's Back, between his two Shoulders; then laying hold of the Patient's Shoulders with each Hand, he must pull them gently and gradually backwards: By which Means the Clavicles will be properly extended. Whilst this is doing, the Surgeon must stand before, and endeavour to replace the Bone with both his Hands, ordering the Assistant to hold the Bone in that Position. He is then (1) to apply the narrow and thick Compress (*Tab. IX, Fig. 13.*) folded up at each End, so as fill up the Cavities above and below the Clavicle. Upon these (2) he is to lay two more narrow

^a A Fracture of the Clavicle is by CELSUS (*Lib. VIII, Cap. 8.*) called *Jugulum fractum*; but all the modern Surgeons and Anatomists give the Name of *Clavicle* to this Bone, and attribute a quite different Signification to the Word *Jugulum*.

Compresses, made in the Form of the *Letter X*. Over all these, he is (3) to apply a Piece of Paste-board (*Tab. VIII, Fig. 12.*) accommodated to the Shoulder and Neck, and first steeped in *Sp. Vin.* or Oxycrate. Then he must (4) place a Ball under the Arm, or bind it several Times with a thick Roller, to prevent the *Humerus* from subsiding. And lastly (5) the whole is to be discreetly bound up, and the Arm suspended in a Sash or Sling, that is put about the Neck. The Plasters that were used to be frequently applied in this Case, have been generally found useless.

V. As it is sometimes very difficult to keep the Arms from pushing inwards, which would disturb the Agglutination; it will be of Service to use a Wooden or Iron Instrument (*Tab. VIII, Fig. 13.*) in the Form of a T, so contrived as to keep back the Shoulders. The Sides of this Instrument are about the Breadth of three Fingers, and lined with Cloth or Leather. It is to be applied thus: *viz.* The two Arms AA, are to be placed against each Shoulder, and the perpendicular Part B, is to go against the Middle of the Back. Through the Aperture C, is passed a double Ligature to fasten it to the Body, the two Arms being first put through the Rings AA, which may be widened or narrowed at Pleasure. The tighter the perpendicular Part B is fastened to the Body, the more the Shoulders are by that Means drawn backward. But if they cannot be this Way drawn tight enough, a Compress, folded lengthways, is to be first placed between the Back and the Instrument: By which Means the Shoulders will be drawn more strongly backwards. The Rings AA, may be made of Iron or Leather, so as to be taken in, or let out, as there may be Occasion.

VI. Whenever there are any loose Splinters of the Bone that are intirely separated, which not only wound and hurt the Flesh, but obstruct the Meeting of the Clavicle; it seems altogether requisite to open the Skin and remove them, before the Reduction of the Bone, treating the Wound as usual. But if there should be any Splinters which still adhere to the Bone, and prick the adjacent Parts, or impede the Reduction; they must be also either taken off with the *Forceps*, (*Plate VIII, Fig. 1.*) or else forced into their Places, whereby they may be again united to the Bone. But to divide the Parts, and remove the Fragments, requires great Caution; lest some of the large subclavian Veins or Arteries be wounded in the Operation, and a fatal Hæmorrhage be thereby produced.

What is to be done in case of loose Splinters.

VII. The *Scapula* is usually fractured, either near its *Acromion* or Head, where it joins with the Clavicle, or in some other Part; which will be distinguished by the Eye, or the Touch. If in its *Processus Acromium*, the Reduction may be easily made, by lifting up the Arm to relax the *Deltoide Muscle*; or by pushing the Arm evenly upwards, and drawing the fractured Parts together with the Fingers; but then they easily slip away again, by any slight Cause, and so are difficultly agglutinated: More especially they are easily separated by the Weight and Motion of the Arm, and the Contraction of the *Deltoide Muscle*: Infomuch that there is scarce any body that ever cures a fractured *Acromion* so as to admit afterwards of a free Motion of the Arm upwards^a. In the mean Time all Means must be used to retain the replaced Bones in their right Situation: A Compress wet with *Sp. Vin.* is to be applied to the Fracture; a Ball is to be put under the Arm-pit to support it; the whole is to be bound up with

Of a Fracture of the *Scapula*.

^a Such is the Opinion of CHESELDEN, treating of this Bone, in his Anatomy.

the Bandage commonly called *Spica*, and the Arm is to be suspended in a Sash or Sling, hung about the Neck; and the Patient must rest himself without Intermission. But if the Neck of the *Scapula*, which lies under the *Acromion*, or its *Acetabulum* should be fractured, (which is a Case that as seldom happens as it is difficult to discover, by reason of its thick Covering) it is a hundred to one, but from the Vicinity of the Articulation, the Tendons, Muscles, Ligaments, Nerves, and large Veins and Arteries, there will follow a Stiffness and Loss of Motion in the Joint, a violent Inflammation, Swelling, and Abscess, with the worst of Symptoms, and even Death itself: As happened in a Case I saw, of a certain Professor at *Helmstadt*^a. But when the Fracture falls on some other Part of the *Scapula*, the Symptoms are generally much milder.

How the fractured *Scapula* is to be reduced.

VIII. That the fractured *Scapula* may be set with the greater Readiness, an Assistant is to extend the Arm gently forwards: The Surgeon in the mean Time dextrously replacing the Fracture with his Hands, should apply afterwards the proper Compresses, and Slips of Paste-board, suitable to the *Scapula*, and first wet with *Sp. Vin.* or Oxycrate; which are then to be firmly bound on with the *Stellate*, or four-headed Bandage, as we shall direct at large in the third and last Part of his Treatise.

FRACTURE in the STERNUM.

Of a fractured *Sternum*.

IX. The *Sternum* is equally subject to Depressions and Fracture, from Falls or Blows, with the rest of the Bones. When either of these happen, the Part is not only uneven and painful, but the subjacent Arteries and Veins are also contused or ruptured; whence arise Pains in the Breast, Difficulty of Breathing, violent Coughs, spitting of Blood, or else Extravasations of it in the *Præcordia*, or between the Duplication of the *Mediastinum*, with many bad Symptoms of the like Nature.

The Signs of a fractured *Sternum*.

X. The Signs therefore of a fractured *Sternum*, will be, in my Opinion, sufficiently evident, from what follows. Namely, its Depression or Fracture will appear not only from the Symptoms beforementioned (N. IX.) but frequently also from the *Sternum's* being unequal or moveable to the Touch; especially when one Part grates against the other. The Depression of the *Sternum* will be also apparent, not only from the Symptoms of the preceding Section, but also from the Cavity or Inequality made in this Part, which is a Sign peculiar to this Disorder.

How the *Sternum* is to be replaced.

XI. In order to set the Fracture, if any Part of the Breast-bone be displaced, it will be very serviceable to lay the Patient on his Back, upon a Bed, or rather a Table, putting a hard Pillow, a large Piece of Cloth rolled up, a Drum, or other Cylinder under his Back, pressing down his Shoulders, by which Means the *Sternum* will be elevated and extended. And to facilitate the Reduction, the Surgeon must press the Sides of the Breast together, and shake them pretty strongly. By this Means you not only push the Ribs forwards, but at the same Time force what is depressed in the *Sternum* into its natural Situation. But when this Method is impracticable, or not proper, the Skin must be divided, and the depressed Part of the *Sternum* lifted up into its Place, by means of a Lever,

^a The same has been observed by CHESELDEN (*loc. citat.*) and by DOUGLASS.

commonly called an Elevator; or else by a Screw, gently wormed into the Part, and pulled upwards. Notwithstanding this Way of Cure is more operose and difficult than the former, it is preferred by GOUVEY (in his *Chirurgie veritable*) and PETIT (*de Morb. Off.*) as the best and readiest Method. As for the fittest Method of retaining the *Sternum* after its Reduction, we shall treat of that more at large, when we come to the Doctrine of Bandages. But if, as it sometimes happens after the Reduction, violent Pains continue under the *Sternum*, and if Blood should gather and suppurate internally between the Duplication of the *Mediastinum*, it will not be improper to trepan the lower Part of the *Sternum* (as PETIT advises) after the Manner we do the *Cranium*: And when the putrid Matter is discharged, and the Cavity cleansed, it should be carefully treated with some vulnerary Balsam. Lastly, if any Blood should be found extravasated in the Cavities of the *Thorax*, the Cure seems to depend entirely upon discharging this by the *Paracentesis*, in the Manner we have described under Wounds of the *Thorax*. As to the Business of Dressing, after the Application of Compresses dipped in warm Wine, or *Sp. Vin.* we must go on with that Kind of Bandage called the *Napkin-and-Scapulary*.

CHAP. VI. Of FRACTURES in the Ribs, Vetebræ, Os Sacrum and Innominatum.

Of FRACTURES in the Ribs, Vetebræ, Os Sacrum and Innominatum.

I. SOMETIMES the Ribs are fractured, or only fissured, in such a Manner, that barely some external and internal Part of them are hurt, and not moved out of the natural Places: Which Case is usually attended with no bad Symptoms, and is often scarce discoverable, the Bone growing together again of itself. But if the whole Rib be fractured, and some Part of it moved out of its Place, it is a more dangerous Case: For the costal Muscles, and the *Pleura* that lines the internal Cavity of the *Thorax*, will be very much disturbed, inflamed, or torn by the separated Fragments of the Bone. When a Rib is fractured, it projects either externally or internally, much in the same Manner as if it was a broken Arch: When it projects externally, the Symptoms are usually much the milder^a; but when it is driven inwards, the Case is much worse, especially if any of the Intercostal Veins or Arteries be divided so as to let Blood run into the *Thorax*. In Consequence of which, we need not wonder if violent Prickings, Inflammation, difficult Respiration, Cough, Fever, Spitting of Blood, Suppuration, Extravasation of Blood in the *Thorax*, or cellular Interstice of the *Mediastinum*, and other bad Symptoms should follow in Course; especially if the neighbouring *Viscera*^b be wounded, or more Ribs be broken at the same Time. If these be not timely remedied, they produce violent Fevers, Inflammation, and Ulceration of the Breast and Lungs, *Empyemas*, incurable *Fistula*, and *Caries* of the Bones; and sometimes Death itself will be the End,

^a Indeed GOUVEY denies that broken Ribs are ever drove outwards; but PETIT (*lib. de Morb. Off.*) witnesses that there may be such a Kind of Fracture.

^b All Fractures of different Ribs at the same Time are ranked by BOHN amongst mortal Wounds. *Lib. de Vuln. Letb. C. 3.* And I myself have been Witness to such a Fracture, where the Patient died in a few Hours.

particularly in a Fracture of more than one Rib at the same Time. It frequently happens, unless the Fracture be a simple one, that the soft Parts are punctured, and an external Wound made, by some sharp Piece of the Bone. If the Parts are wounded, it occasions sometimes a very profuse Hæmorrhage, often very difficult to stop, as the Passage is not easy to the Arteries beneath the Ribs. And if the Blood should not run into the *Thorax*, it can scarce be discharged from thence but by the *Paracentesis*, or else by dilating the Wound, when it happens between the bastard Ribs. If by any external Force the Cartilages should be separated from the Ribs, we term it a Fracture, and treat it in the same Method with other Fractures in this Part, which we are going to describe.

The Method of discovering a Fracture of the Ribs.

II. When the fractured Parts of a Rib keep in their natural Situation, they continue even and smooth to the Eye, and are unaccompanied with any considerable Pain: It is therefore difficult to discover the Fracture. But yet, upon slightly moving the same, it will be attended with some Pain, though it will the more readily grow together. But when the fractured Parts recede from each other, the Deformity will be apparent both to the Eye and Touch, and a Noise will be heard upon moving them. If a sharp Piece of the Bone should molest the *Viscera* internally, it will occasion the greater Part of the Symptoms mentioned at *N. I.* and from the Intensity and Malignity of those, we judge the Fracture to be more or less dangerous. But it also frequently happens, that a Fracture of the Ribs occasions a windy Tumor, called by the Greeks, *Emphysema*; formed by the Air insinuating itself, by a small Wound, between the Skin and Muscles, into the Substance of the cellular or adipose Membrane; spreading itself afterwards up to the Neck, Head, Belly, and other Parts, much after the Manner in which Butchers blow up their Veal.

How a slight Fracture of the Ribs is to be set.

III. In order to replace fractured Ribs, it is always previously necessary to inquire whether the Splinters project externally or internally. When the first is the Case, the Patient is to be placed on a high Table, and the separated Bones must be gently forced by the Fingers into their Places, the proper Compresses dipped in *Spir. Vin.* must be laid on, and then covered with Slips of Paste-board or Splints; and lastly, the circular Bandage, or else the *Napkin-and-Scapulary*. But when the latter is the Case, while the Patient retains a deep Breath, the Surgeon carefully compresses both Sides of the Rib with his Hands, agitating till they are properly fixed. What is farther necessary to be done in this Case, will come under the Head of Bandage; unless that the Paste-board is to be here omitted, and the Napkin not drawn very tight: But the Dressing need not be undone, unless it be over loose, and some Symptoms or the Patient's erect Posture require it. By these Means, Fractures of this Kind are usually cured in about three or four Weeks Time. Through the whole Course of the Cure, as *CELSUS* (*Lib. VIII. Cap. 9.*) advises, the Patient must carefully avoid all Talk and Clamour, Passions and Anger, violent Motions of the Body, Smoke, Dust, and every thing that will occasion sneezing or coughing. But if the Reduction cannot be effected by the Means hitherto delivered, it may not be improper to try by some sticking Plaster, as in a Depression of the *Cranium* at *Book I. Chap. XIV. N. XXIV.*

What is to be done in the more dangerous Fractures of the Ribs,

IV. If any sharp Pieces of the Ribs should pierce the *Pleura*, it will occasion most violent Pains, a Difficulty of Breathing, a Cough, Spitting of Blood, Inflammation,

flammation, Fever, and other such grievous Symptoms: Therefore it will be proper to open the Skin and extract the Fragments which stick in the Flesh with the Fingers, Pliers, Hooks, or other proper Instruments. Unless this Method be followed, the Patient will be in great Danger; to prevent which, Phlebotomy, Clysters, cooling and Anodyne Medicines are to be used, and a thin Diet must be followed. This Method of Incision is also more particularly necessary when the sticking Plaster, and other Means advised, prove insufficient to reduce the Fracture.

V. When there happens to be a Wound of any of the Veins or Arteries which run under the Ribs so as to let their Blood flow internally, the Case will be much the same with the Wounds mentioned in *Book I. Chap. X.* And it seems then necessary to open the *Thorax* near the fractured Part, sufficient to admit the Finger, anointed with some Liniment, and dipped in some styptic Medicine, which is to be held upon the Vessels till the Blood stops. But when the Finger proves ineffectual, the divided Vessel must be discovered, and closed either with a Ligature or an actual Cautey, properly applied. And in order to discharge what is lodged in the *Thorax*, when the Wound itself is in the lower Part thereof, the Surgeon must dilate and keep it open with Lint, as was advised before in Wounds of the *Thorax*. But when the Height of its Situation in the Breast, near the upper true Ribs, will not admit of a convenient Discharge by that, a fresh and more convenient Opening or *Paracentesis* must be made in the lower Part of the *Thorax*; and the Wound in the superior Part must be closed. See *Book I. Chap. X. N. X.*

Of the Veins
and Arteries
hurt.

VI. When an *Emphysema* happens, it will be very proper to enlarge the Opening in the Skin, if too narrow, with the Scalpel; and to bring down the Tumor with Frictions and Bandage, carrying the Compression gradually towards the Opening, so as to expel the included Air by Degrees. But if there should be a Contusion also, it must be treated in the Method which we have already laid down, in the Chapter (XV. *Book I.*) of *Contusions*. If a violent Cough or Inflammation follow, it must be remedied by Bleeding, and other proper Medicines. See an Example in *LE DRAN, Obs. 29. Tom. I.*

How the
Emphysema
and Contu-
sion are to be
treated.

VII. When any of the *Vertebrae* are fractured, either by a Fall, Blow, or any other Cause, without hurting the spinal Marrow; we may reasonably suppose that the Fracture is confined to some of the oblique or spinal Processes; and therefore the Patient will be in no great Danger. But when the Body of the *Vertebrae* is either broke or split by some external Force*, and the contiguous spinal Marrow bruised or compressed; all Parts of the Limbs and *Viscera* beneath that Vertebra become immoveable and rigid. No wonder then, if a speedy or slow-paced Death often follows, in proportion to the Degree of Damage. Here it may be also proper to recal to Mind, what has been said in the preceding Book, on Wounds of the *Medulla Spinalis*. And lastly, if the transverse Processes of the *Vertebrae* are broke, which incline towards the Cavity of the *Thorax*, it is scarce possible that the Heads of the Ribs which are there connected, should escape being fractured also; which makes the Case very deplorable.

Fractures of
the *Verte-
brae*.

* GOUVEY thinks the Body of the *Vertebrae* cannot be fractured, unless by a Bullet: But I have seen them from a violent Fall off a high Place, and the Patient died soon after, from bruising the *Spinal Marrow*; as they generally do in this Case.

The Signs
of Fractures
in the *Verte-*
brae.

VIII. Fractures in the *Vertebrae* may be judged to be present from (1) considering the Nature of the external Violence, whether it be a great Fall, Blow, or the like; but more especially (2) from the Pains seated about the affected *Vertebrae*; and lastly (3) from the Manifestation thereof, to the Touch, Eye, and Ear.

How to re-
place the
fractured
Processes
or *Apophyses*.

IX. When only the Processes of the *Vertebrae* are found broken, it will be much the best Way to force them into their Places with the Fingers, placing narrow Compresses dipped in warm Spirit of Wine on each Side the *Vertebrae*, and over them, Slips of thick Paste-board, to be kept on by the *Napkin-and-Scapulary*. For by this Means, the Bones of the *Vertebrae*, which are very soft and spongy, will quickly and easily grow together again.

How the
worst Kind
of Fractures
in the *Ver-*
tebrae are to
be treated.

X. If in any Case the Spinal Marrow should be divided, Death will be generally an inevitable Consequence. But to offer the Patient no Assistance because we despair, would seem cruel and uncharitable; therefore we must try our Skill, though our Attempt should be in vain: In order to which, the Surgeon must lay bare the fractured *Vertebra* with a Scalpel, and replace or else remove such Fragments as injured the spinal Marrow. The Wound is to be afterwards gently cleansed as usual, and dressed with the Balsams mentioned *Book I, Chap. II, N. XV*, clapping over them a Compress dipped in warm Spirit of Wine, or Lime-water, and Spirit of Wine camphorated, to be held on with the *Napkin-and-Scapulary*, till the Wound shall terminate either in a perfect Cure or Death.

Fracture of
the *Os Sa-*
crum.

XI. It sometimes also happens, that by a Fall or a Blow, the *Os Sacrum* becomes in like Manner fractured; which may be discerned to be broken, from considering the external Violence, the Pains, by the Touch, &c. as is usual in other Fractures.

How to set a
Fracture of
the *Os Sa-*
crum.

XII. As soon therefore as the *Os Sacrum* is found to be fractured, its Fragments are to be forced into their Places with the Fingers. But if any Part of it be depressed inwards, it may be convenient to introduce a Finger (that has first had its Nail cut close and been dipped in Oil or Butter) up the *Anus*, in order to thrust the depressed Fragment into its proper Place, to which it is to be directed externally by the other Hand. This being performed, we must apply some Plaster suitable for Fractures, with Compresses dipped in *Sp. Vin.* over it, to be kept on by the T Bandage; or the Plaster may be omitted and only the Compress and Bandage retained. And lastly, to facilitate the Agglutination, the Patient should keep his Bed quietly on his Sides for about a Fortnight: Or if he must needs sit at Times, let it be in a Chair without a Bottom, to avoid displacing of the Bone, from touching the Seat.

How the *Os*
Innominatum
is to be re-
placed.

XIII. When the *Os Innominatum* is broke, which seldom happens, it is readily discovered by the Injury and Symptoms in the neighbouring Parts, and is more particularly dangerous when the Patient discharges a brown and bloody Matter. In restoring this Bone, the Patient must lay down on his sound Side, the Bone is to be replaced with the Hands, covered with Compresses, dipped in *Sp. Vin.* and bound up with the Bandage *Spica*. Afterwards Bleeding, with cooling and relaxing Medicines must be used, and a thin Diet observed; and let the Patient lie either on the sound Side, or on his Back.

C H A P. VII.

Of FRACTURES in the Bones of the Humerus, Cubitus, and Hands.

I. **T**HE *Os Humeri* is broke either in its Middle, which is the least dangerous; or else near its upper or lower Head, which is much worse, as being more difficult to cure, and producing more violent Symptoms, acute Pains, Tumors, and Inflammations. Indeed Fractures of this Part are usually very obvious to the Senses, being exposed to the Eyes and Hands: But then they require a different Treatment, according to the particular Part injured. It sometimes also happens, that the fractured Parts of this Bone keep their Places: But it more frequently falls out, that they slip one over the other; by which Means the fractured Limb becomes shorter than the sound one. But it will sometimes, though seldom, happen, that the two Parts of the Bone shall recede much from each other; by reason of the Weight of the Arm, which they sustain. If the first be the Case, the Fragments are usually more easily and readily replaced; but in the latter, there is required more Force and Skill to reduce the Bones to their Places, from whence they were removed: Especially if the Patient has tense Nerves and large Muscles, as is usually observed in strong Men.

Fracture of the Humerus or Fore-Arm.

II. In a Fracture of the *Os Humeri*, the Arm may be readily extended in the following Manner: Let the Patient be seated on a high Stool, and an Assistant lay firm hold of his Arm above the Fracture, keeping his Elbow gently bended: Then the lower Part of the Arm, beneath the Fracture, is in like manner to be taken hold of, and the Arm is to be gently extended forward, by endeavouring to remove easily each Part from the other in a right Line. Then the Surgeon himself lays hold of the fractured Part of the Arm, with both his Hands, and strives to replace the Bones, held in a due Extension by the Assistant, into their proper Situations; judiciously rolling up the Part with proper Bandages, agreeable to what has been said of them in general in the Introduction, and what we shall explain more at large in the particular Doctrine of Bandages alone. If one Assistant be not able sufficiently to extend the Arm of a robust Patient, the Office may be undertaken by two; or else thin Napkins or other Linen Bandages may be wound round each Articulation of the Arm, and given to several Assistants, to be pulled in opposite Directions, till the Limb be stretched a little longer than it naturally ought; and then the Surgeon is to replace the Bones: But if the Surgeon's Hands and Napkin prove insufficient, which is seldom the Case, HILDANUS's Girt, with the Sling (as described, *Plate VIII, Fig. 17.*) must be applied to the Arm above the *Cubitus*; by which you may extend it, and reduce the Bone to its proper Situation.

How a broken Arm is to be set.

III. The lower Part of the Arm, called by Anatomists *Cubitus*, contains two Bones; the *Radius* and the *Ulna*. A Fracture in this Part may therefore happen to only one, or to both of these Bones; and that, either in their Middle or Extremities. But when they are both broke together, the Bones are not only very easily distorted from each other, but are also replaced and joined together again with much more Difficulty. But if one only should be broke, whilst the other

Of Fractures in the Cubitus, or Lower Arm.

other remains whole, the fractured Parts do not much recede out of their Places, nor are they very difficult to reduce and retain. For the sound Bone is found to be a better Direction and Support in this Case, than either Splints or Bandages. When the Fracture happens towards the lower Head, near the *Pronator quadratus* Muscle, the fractured Part is strongly drawn (by that Muscle, and the intervening Ligament that is spread between the *Radius* and *Ulna*) towards the sound Bone, which makes it more difficult to replace. This is therefore a very material Circumstance to be considered in the *Prognosis* and Cure of this Fracture.

The Signs
of a Frac-
ture in the
Cubitus.

IV. A Fracture in these Bones of the Arm may be well enough discovered by the Signs common to Fractures in general. But whether one or both be broke, and which of them is the Bone and its particular Part fractured; these may be known by the Sight and Touch, and by properly moving the Joint in or out, as may be necessary. It is however much easier to discover a Fracture in the *Ulna*, from its Inability to support the Joint, as usual, than that of the *Radius*. The Ear will also frequently assist the Sight, in the Search after this Fracture: For there will be generally perceived a Grating of the Bones, upon moving the Patient's Hand in and out, whilst the upper Part of the *Cubitus* is held firm.

In what
Manner the
Radius is to
be set.

V. If the *Radius* is to be set or replaced, whose Fragment is contracted towards the *Ulna*, an Assistant must hold the Arm whilst the Surgeon inclines the Patient's Hand towards the *Ulna*, to draw back the contracted Part of the *Radius*. When this is done, he must carefully reduce them by Compression on each Side with the Palms of both his Hands, so as to restore the compressed Muscles, between the *Radius* and *Ulna*, and Fragments of the *Radius*, to their proper Places. The Arm is to be then bound up in the Method we shall hereafter deliver. And the Limb is to be put into a sort of Case, (*Tab. VIII, Fig. 14.*) made of Pasteboard or light Wood, to be suspended in a Sling put about the Neck^a.

How the
Ulna is to
be replaced.

VI. In setting a Fracture of the *Ulna*, the same Method is to be observed with that of reducing the *Radius* as before, binding and suspending it in the same manner: But there is this Difference necessary to be observed, that in the Extension the Hand must be bent towards the Thumb and *Radius*, before the distorted Part of the *Ulna* can be compressed into its Place.

How we
are to treat
a Fracture
of both the
Bones.

VII. When both Bones of the *Cubitus* are broke, the Method of Cure will be much the same with that used to each of the Bones, when broke singly: Unless that there is required more Strength and Circumspection in replacing and retaining them, and the Bandage must be applied with greater Caution. And let the Surgeon, with the Palms of his Hands, compress the Patient's Flesh on each Side of the Arm; by which Means the two Bones will mutually accord in returning to their natural Situation. We must be also careful to observe, that, while the Arm continues a good while without Motion, the Mucilage of the Joint does not harden, or the Ligament become stiff, and the Arm or *Cubitus* be thereby rendered immoveable. It will be therefore not improper to unbind the Part every other or third Day, and to move it carefully and gently, a little backward and forward, and sometimes to foment it with warm Oil or Water; for by this Means, its natural Motion will be easily preserved.

^a Vide SCULTET. *Tab. LVI. & infra Tab. 38. Fig. 17.*

VIII. The Bones of the Wrist are seldom the Subject of Fracture, on account of their Smallness: But it sometimes happens to them, from the Stroke or Com-Fracture of the Wrist. pressure of some hard or heavy Body. When this is the Case, there usually remain but little Hopes of effecting a Cure. For the Ligaments and Tendons are here so numerous, and the Bones themselves are so very small, that it seems scarce possible to reduce them into their Places, or make them grow together again. And on this Account, the Joint of the Hand generally becomes stiff and immoveable: Or else violent Inflammations, Abscesses, Suppurations, *Fistule*, and *Caries* of the Bones do thence arise; which, on account of the Softness of the Bones, and the Difficulty of discharging the Matter, are seldom remedied but by amputating the Hand. Agreeable with this, RUYSCH (*Obs. Anat. Chirurg. pag. 10.*) among others, instances a Fracture of this Kind, which, after three Years Treatment, remained still uncured.

IX. But that the Surgeon may not seem to be altogether negligent on his Part, he is rather to try what he can do in the Case, than to leave the Patient destitute of Help. It will be therefore most proper for an Assistant to lay hold of the Hand and Arm, above the fractured Wrist, and to extend them as much as is sufficient, in opposite Directions. While this is doing, the Surgeon must use all his Endeavours to restore the Fragments to their proper Places, with his Hands: And after he has very curiously reduced the Fracture, it is to be bound up with a suitable Bandage.How a Fracture of the Wrist is to be treated.

X. As the *Metacarpus* is much more subject to Fractures than the Wrist, because its Bones are larger; upon the same Account it is also more easily replaced and cured. There can be hardly a better Method of reducing this Fracture, than that of spreading the Hand upon a smooth Table by an Assistant, the Surgeon carefully using all his Endeavours to replace the Bones with his Fingers, securing them with a proper Bandage. An Instance of a Fracture in the Wrist with a Wound, may be seen in LE DRAN'S *Obs. 56. Tom. I.*Fracture of the Hand, or Metacarpus.

XI. When one or more of the Bones in the Fingers are broke, the Surgeon's principal Business is, to carefully replace what has been removed, and to roll up the Finger a little Way with a narrow Bandage, and then to bind it firmly to the next sound Finger. If the Thumb is fractured, it must be supported with small Splints, and secured with a proper Bandage. The Method of commodiously applying the Bandage when several of the Fingers are broke at once, will be declared hereafter in the Doctrine of Bandages. But when the Hand or a Finger is so violently mashed as to have no Room to expect a Cure, it is more advisable to cut it entirely off, than to constantly torment the Patient, and perhaps put him in Danger of his Life.Fractures of the Fingers.

C H A P. VIII. Of a fractured THIGH.

I. **T**HE Thigh-bone, though the largest and stoutest in the whole Body, is frequently broke after several different Manners; and that either in its Middle, or towards its Heads and Articulations: But more frequently near that Part which Anatomists call its Neck, near its Articulation with the Hip-bone. Which, whenever it happens, is very difficult to set; and more difficult to retain in its Place. When the Bone is broke in two Places at once, the Danger

Danger is still greater: And if the Patient should escape Death, which they usually do not, it is a common Case for him to be ever afterwards lame. Sometimes the Bone is broke transversely, sometimes obliquely; and at other Times the Ends slip one over the other, which makes it a very bad Case. For the Muscles of this Part being very robust, and strongly contracted, draw the lower End of the Bone with a considerable Force upward, so as to make it require a considerable Strength to extend and replace it. The oblique Fracture more frequently slips out of its Place again than the transverse, and generally leaves the Thigh somewhat shorter than the other, notwithstanding the Surgeon has performed his Duty with Exactness. It is therefore necessary to use in these Cases, besides the Means to be hereafter mentioned, a more strict Bandage, than in the transverse Fracture, to prevent the replaced Bones from being easily moved.

How a Fracture of the Thigh is to be set.

II. In reducing a fractured Thigh, we are to consider whether the Bone be broke near its Neck, or in some other Part: Which Consideration is always very necessary for the better replacing and binding up the Limb. Whenever, then, a Fracture of the Thigh-bone happens, either in the Middle or towards its lower Head, it is to be extended and replaced with the Hands like other Fractures: excepting that the extending Force here required, especially in robust Patients, must be much greater. Therefore more and stronger Assistants are to be here employed, who are sufficiently to extend the Limb with their Hands; or, where their Hands will not suffice, Slings, Napkins, or Linen Bandages may be bound round each Head of the Thigh, whereby the fractured Bone may be extended both Ways, while the Surgeon cautiously reduces the Fracture with his Hands, and treats it with a proper Dressing.

The Girt or Belt of HILDANUS.

III. But when the Extension cannot be performed effectually by the Hands, Slings, nor Bandages, which is a Case that seldom happens, we must then have recourse to the Belt or Girt of HILDANUS, *Tab. VIII. Fig. 17.* which is to be drawn and buckled very tight above the Knee, being first introduced through the Eyes of the Hooks A A, upon which is to be fastened a strong and small Rope B B, about the Middle, C, whereof are to be applied the Hands of the Assistants, or Napkins, &c. by which Means a sufficient Extension may be made, in order to replace the Fragments in their former Situations. Nor is this Contrivance restrained to the lower Limbs only; for it may be applied upon Occasion, to extend Fractures of the *Humerus* and *Cubitus*. If a fractured *Cubitus* is to be extended, the Girt is to be fastened above the Hand; if the *Humerus*, above the Elbow.

Of the compound Pulley, or Poly-spaston.

IV. If the last Method of Extension shall prove ineffectual by itself, it seems every way necessary to try if any thing can be done more to the Purpose by the Pullies of *Tab. VIII. Fig. 15.* The Hook A, of one Pulley, is to be fastened upon the Rope of *Fig. 17.* at its Part, C; the Hook of the other Pulley B, is to be hung upon the Ring A, of the Hand-screw B, of *Fig. 16*; which is to be first screwed tight into some Beam or Rafter. Then, the Patient being held firm, about the other Head of the fractured Limb, by Means of Slings, Napkins, or other strong and long Linen Bandages, to prevent his giving way to the Extension; the Rope C, put through the Pullies D, and E, of *Fig. 18.* must now be drawn through, till the Thigh-bone be sufficiently extended, so as to admit of a convenient Reduction thereof by the Surgeon. Here it is to be observed, that the more Wheels the Rope passes round in the Pullies D, and E, of

of *Fig. 18.* the more easily and gradually will the Extension be performed, in-
somuch that by this Instrument one Man may draw more than ten without it.

V. When the Neck itself of the Thigh-bone is broke, to which, from its oblique or transverse Direction, and spongy or brittle Substance, it is very subject; it makes a Fracture not only very difficult to reduce, but such a one also as can be seldom cured without leaving the Limb lame or shorter than the other, as HILDANUS, (*Cent. V. Obs. 86.*) RUYSHCIUS, and others testify. Now the Reasons for this Calamity are more than one. For (1) the Fragments cannot, but with great Difficulty, be pressed into their right Places, by Reason of the great Thickness and Strength of the Muscles which cover them. (2) It seldom happens that the Bones can be retained in their natural Position, after they have been very well set: Because the Muscles, which pass over and are inserted a little below the Neck of this Bone, draw its lower Part upwards. And both these generally happen the more easily, (3) because of the oblique Position of the Neck of this Bone, which is inserted into its Head in a Direction not perpendicular nor parallel, but as it were sloping on one Side of the same: As will evidently appear upon viewing this Bone in a Skeleton. So that we have hence none of us any occasion to wonder, if Lameness and other bad Accidents follow as Consequences of this Kind of Fracture.

A Fracture
in the Neck
of the
Thigh-
bone.

VI. To the foregoing Reasons we may add, (4) that it is very difficult to discover when the Neck of the Thigh-bone is fractured, the Case being almost always taken for the Head of the same Bone being slipped out of its *Acetabulum* or Socket: Till first PAREY (*Lib. XIV. Cap. 21.*) then SCHENCKIUS (*Obs. XI, Lib. 5.*) after them the celebrated RUYSCH^a (when the Observations of the two former were forgot) and, since him, several other eminent Surgeons and Physicians^b have made it very evident that the spongy Neck of the Thigh-bone is, and may be oftener broke in two, than its Head, defended by very strong Ligaments, be pushed out of its deep Socket by any external Violence. Of this considerable Observation, the Physicians and Surgeons of not only former, but even the last Age, were so generally ignorant, that they never in the least suspected the Case to be a Fracture, but treated the Patient as if the Thigh had been luxated, tormenting and miserably distorting the Member with the Machines used in that Case. Since, therefore, this Method of treating the Patient has been found by Experience to be not only fruitless, but barbarous; it is highly necessary we should recommend another Practice, and such as might prevent those acute Pains, violent Inflammations, and many dangerous Symptoms which might otherwise ensue.

The Diffi-
culty of dis-
covering a
Fracture in
the Neck of
the Thigh-
bone.

VII. When we think the external Force to have been sufficient to produce a Fracture; when the Patient cannot bear any Stress upon the Limb by setting his Foot to the Ground; when very acute Pains are felt about the Articulation itself; and when we find the affected Limb shorter than the sound one, it being an easy Matter to turn the Foot almost round from one Side to the other, and perceive any cracking or grating of the Bones in that Motion, we may then reasonably suppose that the Neck of the Thigh-bone is fractured. We must

How this
Kind of
Fracture is
to be dis-
covered and
cured.

^a In *Theaur. Anat. VIII. Tab. III. Fig. 1.* and *Thef. IX. Tab. I. Fig. 1.*

^b CHESELDEN, *Anatom.* upon the Bones of the lower Extremities, and in *Tab. VI. G, H.* DOUGLAS, *Philosoph. Transact. N. CCCLXXXI. Ann. 1716*; and PETIT, on *Diseases of the Bones.* SALTZMAN, *Dissert. de Fractura Femoris frequentiori*, and others.

then carefully avoid the violent Extension of the Limb, which was used formerly under the Notion of a Luxation, by the Instruments contrived by SCULTETUS, and others, for that Purpose. Our Business here is, to extend the Limb very gently and gradually, till the disordered Limb be of the same Length with the sound one; and this by Means of a Napkin, proper Slings, or the Hands of a stout Assistant fastned round the Foot, or else by the preceding Girt and Pulley; In a Manner by which we may be able to rejoin, in some Measure, if not perfectly, the Neck of the Thigh-bone with its Head still firmly adhering in its Socket. And though a Shortness of the Limb, or Lameness is generally left behind after this Fracture; yet because there are some cured without those Attendants, I must approve, as very useful, such a strict Bandage as may apply and retain the Neck to the Head of the Bone, so as that they may gradually grow together again. For which Purpose, we usually apply the Bandage called *Spica inguinalis*, in this Case; then a large and broad Linen Cloth or Napkin is placed between the Thighs, to keep the Body of it from subsiding; and lastly, Ligatures are put about the Knee and Ankle, whereby the Foot is fastened to the lower End of the Bed, with a little Pad of Straw, to prevent the Limb from being contracted upwards: But we shall describe all this more at large, when we come to the Doctrine of Bandages. Indeed PETIT teaches, that this Kind of Fracture is to be bound up simply in the same Method with other Fractures of the Thigh; but that this is not reasonable, the Experienced herein will readily allow. Having proceeded thus far regularly, and placed the Patient in as convenient a Posture as possible, we must all along observe, with a strict Eye, whether the afflicted Member be either equal or shorter than the sound one. If it should be found to become shorter, there will be great room to suspect that the Neck of the Thigh-bone is slipped out of its Place again: And therefore it must be gently extended again, after unbinding it, till it becomes of the same Length with the sound one as before. But when the Foot of this continues of the same Length with that of the sound Limb, there is great room to hope that the Patient will be happily cured; if continued Rest and a proper Diet be regularly observed. What remains, is to be left to Nature.

How such a fractured Thigh is to be retained in its proper Situation.

VIII. If we had an Instrument that would keep the fractured Thigh properly extended and of the same Length with the sound one, for about fourteen Days, or till the Cure was perfect, we could go on with much more Certainty and Success, in the Cure of Fractures in the Neck of the Thigh-bone, than we do. He therefore would be Author of a no small but important Advantage that should contrive a Machine fit for this Purpose. For though HILDANUS has described (*Cent. V. Obs. 86.*) an Instrument proper for extending Thighs which are obliquely fractured; there is yet great room to doubt of its Fitness for this Kind of Fracture. For he does not, that I know of, supply us with any Instances of Extensions or happy Cures that have been made by this Instrument. But till we have a more proper Machine contrived, and when the other Means are not found of themselves sufficient, it will not be amiss to use the forementioned Instrument of HILDANUS; or, when that is also of itself insufficient, to add the Straw-pad, the large four-headed Bandage, and the rest of the Apparatus described by HILDANUS; or to bind two long Napkins about each Groin, fastening them by Nails or Rings to the Head-bed-posts or Sides, so as to retain the Patient's Body sufficiently firm from descending. But that the lower

Part of the Limb may not give Way upwards, a Ligature or Bandage is to be put round the Knee and Ankle, to be fastened to the Bed's Feet, as we observed at § VII. by which means the Limb may be retained in its proper Posture till the broken Neck of the Thigh-bone be joined firmly together. The same Method of Binding and Retaining may be also useful in other Fractures of the Thighs, but it is found not only useful, but really necessary in oblique Fractures of this Limb. But to prevent the Napkins or Ligatures from galling the Groins, it may be sometimes proper to interpose soft Compresses or Lint; and for Advice concerning the proper Posture in which a broken Thigh is to be retained, besides what has been briefly said at *Chap. I. N. XXXVI.* we shall be more full and particular in the Doctrine of Bandages^a.

IX. If a Fracture of the Thigh be accompanied with a Wound, it makes the Case very dangerous and difficult to cure: And if these Accidents should happen to be inflicted on the neighbouring Joint, Death is generally the Consequence; more especially when any of the large Blood-vessels are wounded, as must be evident from the great Hæmorrhage. So also is the Fracture dangerous, when the Wound is seated in the back Part of the Thigh; because it is with great Difficulty to be cleansed and dressed.

A Fracture
of the
Thigh with
a Wound.

X. In these Fractures with a Wound, the eighteen-headed Bandage, *Tab. IX. Cure. Fig. 4.* is to be used for the Dressing: This is described at large in our third Part, upon Bandages. But if the wounded Part be very much contused, so that extravasated Blood be lodged under the Skin and about its Interstices, it is to be carefully opened by several Incisions of a sufficient Depth, that the extravasated Blood, which would, in a short Time putrify, may be by this means discharged. The injured Parts are to be afterwards washed with *Aq. Calcis* mixed with a fourth Part of *Sp. Vin. Camph.* or some such resolving Liquor, till the contused Parts are digested.

XI. When this Kind of Fracture is accompanied with Loss of Blood, which is not very violent, nor the Bone near, the Wound is to be dressed with dry scraped Lint, properly folded, so as to fill the Wound: More and larger Compresses are to be laid over these, and the whole is to be retained with a proper Bandage, as is usual in Hæmorrhages. But if the Flux be greater, we recommend the Use of astringent Liquors, such as are used to stop the Hæmorrhages of Wounds, especially the most highly rectified Spirit of Wine, which is here found to be extremely serviceable and effectual: But if it run still more vehemently, from an Artery, the Vessel is to be first discovered by the *Tournequet*, and afterwards secured by Ligature. When this Kind of Fracture is attended with very great Hæmorrhage, and a violent Splintering of the Bone from Gun Shot, so as to indicate the crural Artery to be lacerated; if our Desire is sincerely to save the Life of the Patient, our best Method will generally be, to amputate the Thigh and tie up the Artery in Time: For by this means the Patient will be more easily preserved, than if we strive to save the lower Parts of his Limb; for the crural Artery is so large that it seldom grows together, and if it does, the lower Parts are soon seized with a Gangrene. After the Blood is stopped and the Wound cleansed, the Fragments of the Bone may

When accompanied
with Hæ-
morrhage.

^a In simple Fractures of the *Femur* or *Tibia*, the eighteen-headed Bandage may be properly applied.

be replaced, and the Limb carefully bound up with Compresses, Splints, and the Bandage with eighteen Heads, defending it in a Case of Straw, by the *French* called *Fanons*. The Wound is to be afterwards unbound every Day, cleansed from its Matter, and dressed with some digestive Ointment or vulnerary Balsam, till it be healed, Instances of Fractures of the Thigh with a Wound may be seen in SCULTETUS, *Obs.* 77 and 78. and PURMAN, *Obs.* 63.

AN EXPLANATION of the EIGHTH TABLE.

Tab. VIII.
explained.

Fig. 1. Is a sort of large and sharp *Forceps*, proper to cut off the Splinters or Fragments of Bones, which stick out: But to make them cut the easier, the Handles should be two or three Inches longer than the Figure.

Fig. 2. Is a simple Hook.

Fig. 3. Is a double Hook, serving for various Purposes in Surgery and Anatomy.

Fig. 4. Is a Needle, for taking up Arteries with a Ligature in Hæmorrhages, and many other Cases. A, is its blunt Point, B, its Eye transmitting the Thread, C, its little Head.

Fig. 5. Is a Case to hold the subsequent Instrument, which is used to hold and apply the *Lapis Infernalis*; or Caustic Stone.

Fig. 6. The Instrument itself, made of Steel, for holding and conducting the said Stone. *a*, the Nippers which lay hold of the Stone, *b*, the little Ring which shuts and holds them fast upon the Stone, *c*, the other End of the Instrument used as a sticking Quill to support the Lips of Wounds.

Fig. 7. Exhibits the Figure of a Splint, made of thin Wood or Paste-board, to be used in Fractures of the Arms and Feet: Its Breadth should be about three or four Fingers, and its Length suitable to the Size of the Limb.

Fig. 8. Is a Paste-board Splint, such as is sometimes used in Fractures of the Nose: Its Size is to correspond to that of the Nose.

Fig. 9. Is a Splint of Cap-paper, suited to the lower Jaw, when fractured only on one Side.

Fig. 10. Is a double Splint of the same Kind, for the lower Jaw, when fractured on both Sides: It is to be applied so that the Aperture (*a*) in the Middle may let in the Chin: But its two Extremities or Wings (*bb*) which may be folded together in the Middle (*a*), are to be applied towards the Ears.

Fig. 11. Is a Compress, in Form of an X, to be used in Fractures of the Clavicle.

Fig. 12. Is a Paste-board Splint, to be laid over the former Compress, in the same Fracture.

Fig. 13. Is an Iron or Steel Instrument in the Form of a T, useful to retain the Shoulders in a proper Posture, in Fractures of the Clavicle. AA, its transverse Part, to which are fastened Iron Rings, to retain and keep back the Shoulders. B, its perpendicular Part going down the Back. C, an Aperture in its lower End by which it is to be fastened with a Ligature round the Waist, to be tyed before on the Belly. See Chap. V. § V. foregoing.

Fig. 14. Is a Paste-board Case, in which a fractured Arm is to be lodged after it has been set and dressed: Its Size is to be answerable to the Arm.

Fig. 15.

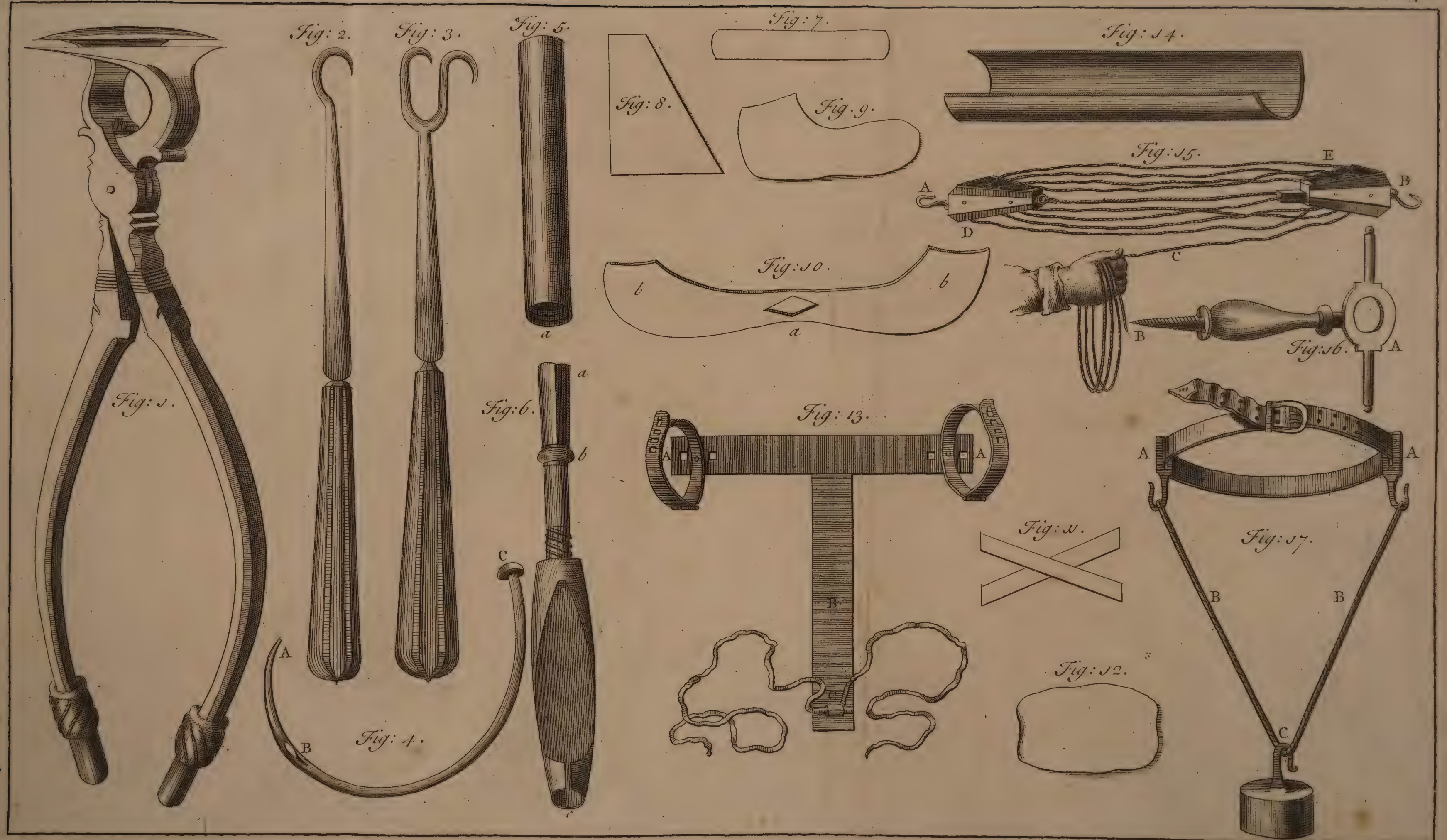


Fig. 15. Is a *Polyspaston*, or compound Pulley used to extend Fractures, described before at *Chap. VIII. § IV.* A and B, are two Hooks, by which the Instrument is fastened on both Sides. C, the Rope, by drawing which, an Extension is made upon the broken Limb. D, and E, are the two Pullies, consisting of several Wheels, by which the Force of the Drawer is very much increased.

Fig. 16. Is a strong Iron Screw, whose Worm or Thread B, is to be forced by the two Handles, into some Beam or Rafter; and upon its Ring A, is to be hung the Pulley E, foregoing.

Fig. 17. Is the Girt of HILDANUS, sometimes necessary to make Extensions upon the upper and lower Limbs: AA, two Hooks, upon which is hung the Sling or Rope BB; C being the Place where the extending Force is to be applied. See above *Chap. VIII. N. XIII.* The Girt should be three or four Fingers wide, and a Foot and a half long.

CHAP. IX.

Of a FRACTURE of the PATELLA, ROTULA, or KNEE-PAN:

I. IN order the better to understand and cure a Fracture of the *Patella*, it is previously necessary to learn from Anatomy, the Manner in which it adheres by Means of Ligaments and Tendons to both the Leg and Thigh; where we may also observe, its Ascension with the contracting Muscles upwards in extending the Foot, its Descension upon bending the same, and the great Force it sustains both Ways in violent Motions of the Body. When a Fracture of this Bone happens, from a Fall, Blow, or any other external Violence; the Course of the Fracture is either longitudinal, transverse, or in several Directions at the same Time: But of all, the transverse Fracture is most frequent. The longitudinal happens much seldomer, and is more readily cured; because the Fragments in this Case, generally keep in their right Places^a. But when the Bone is broke transversely, and into many Pieces, the Case is usually much more dangerous. For though the lower Part of the Bone keep in its Place, as being not annexed to any Muscles; yet the superior Part of the Bone is drawn upwards, by the very strong Muscles to which it is joined, which makes it very difficult to reduce and retain.

The Nature of this Kind of Fracture.

II. The Discovery of this Kind of Fracture, is usually Matter of no great Difficulty. For it may be easily perceived, by the Eye and the Touch, whether the *Patella* be found or divided; and also, when it is divided, whether it be broken transversely, longitudinally, or into many Pieces: Whether the Fragments adhere to each other, or are separated at some Distance. In examining this Fracture, forcible Flexures of the Knee are to be avoided as of no Service, but very painful and pernicious; because by this Means, the Fragments are pulled farther from each other, and PETIT gives an Instance of Death occasioned

A Fracture of the *Patella* easy to discover.

^a Indeed, GARENGEOT (*Lib. de Instrum. Tom. II. pag. 310.*) thinks, that this Bone cannot be broke longitudinally; but that this Case sometimes happens, has been shewed by PETIT, among many others, in his Chapter of a fractured *Patella*.

thereby,

thereby. But it sometimes happens, through the Obesity of the Patient, and the little or no Separation of the fractured Parts, that this Case is not so soon to be discovered as is otherwise common. But then the Fracture is also less dangerous; for the Juice of the Bone, of which the *Callus* is formed, cannot so easily insinuate itself into the Articulation, whereby the Knee would become rigid and immoveable, which frequently happens in some Fractures of the Bone.

Prognosis.

III. It is generally a very difficult Matter to make a perfect Cure of this Fracture, as those experienced herein have often found. For if we may believe Practitioners, the Joint is generally left either rigid, or at best its Motions are performed with Difficulty. For, besides the Insinuation of the ossific Juice, which was destined to the Formation of *Callus*, into the Recesses of the Articulation; the Mucilage also, which lubricates the Joint itself, mixes and indurates with it: So that the Bones of the Leg and Thigh being joined together like two Pieces of Wood with the strongest Glew, the Joint becomes stiff, the Bones grow together and become like one. And this happens the more readily because of the long continued Inactivity of the Joint till the Bone is united, which is extremely necessary in these, and especially in transverse Fractures; by which long Inactivity, the lubricating *Mucus* of the Joint generally grows thick and hard. But it also usually happens, that the Tendon which sustains the *Patella*, and chiefly directs the Motion of the Joint, is violently contused at the same Time, and from the same Cause with the Fracture of the *Patella*: Upon which Account, also, the Motion of the Knee is greatly impeded or wholly destroyed. We therefore need not wonder that those who have once broke one of their Knee-pans, should be so subject to frequent Falls, and in Consequence of them break the other; since the violent Contusion of this Tendon always leaves an incurable Weakness in the Joint.

Cure.

IV. With regard to the Cure of a fractured *Patella*, it must be attempted in the following Method: In a longitudinal or perpendicular Fracture, the Patient must be laid upon his Back, and extending his Foot, the Surgeon in the mean Time replaces the Fragments on each Side with both his Hands, binding them up carefully with the uniting Bandage; which must be applied here in the same Manner with that used in large Wounds of the Belly and Fore-head, which we have before taken Notice of, and shall describe more largely in the Doctrine of Bandages. But when the *Patella* is broken transversely, or into several Pieces, the Patient being put in the same Posture and extending his Foot as before: The Surgeon is then carefully to endeavour to bring together, compress, and replace the Fragments of the Bone in their natural Situations, with the Palms of his Hands, Thumbs, and Fingers, retaining them firm with the Application of a Plaster in Form of a half Moon (*Tab. IX. Fig. 2.*) or perforated (as at *Fig. 3.*) and then the Foot of the afflicted Member is to be bound up and placed so that it cannot be easily bent or otherwise disturbed. We intend to be more particular on the whole Business of the Cure, in the Doctrine of Bandages. But notwithstanding there are to be found several particular Machines invented by Surgeons for retaining this Kind of Fracture;

* SOLINGEN recommends an Instrument of this Kind in his *Surgery*, in the Chapter of a broken *Patella*: and in *Tab. XV. Fig. 26: Edit. Amstel, 1698.* we find the Machine delineated.

GARENGEOT (*Lib. de Instit. Chirurg.*) has also described another; and we are acquainted with still more.

they all seem to be much of such a Make as to fall vastly short of being sufficient for the present Design. But to prevent the replaced Bone from being disturbed or broken a-fresh, which is an Accident we find often happens; it must be carefully observed that the Patient do not any way exercise his Leg till after the Expiration of the ninth or tenth Week. For a Fracture of the Knee-pan is seldom sufficiently united before that Time: And such as use their Legs before that Time, generally halt in Walking, as RUYSCH (*Obs.* 3.) observes. Further, upon this Kind of Fracture, the Observation which PURMANNUS has collected in his Surgery (*P.* iii. *C.* 21.) deserve to be consulted.

C H A P. X.

Of FRACTURES in the Bones of the LEG and FOOT.

I. **T**HERE is but little new to be said on Fractures of the Leg and its two Fracture of the Leg Bones, the *Tibia* and *Fibula*, which has not been before observed here: So that there is no Occasion for more than the general Directions, which we have before laid down, to be observed in the Cure of every Kind of Fracture: viz. that the broken Bones are to be properly extended by the Hands or Slings, and then accurately replaced; to be afterwards properly bound up, and retained in the most suitable posture. This I have further to observe, that sometimes both the Bones, and at other Times one of them only are broken: If both, it seldom happens that each of them are broke directly in the same Place, but one of them a little higher than the other. If the *Tibia* alone be broke, it is easily discovered, it being placed so near the Skin: But if the *Fibula* alone, which is buried under so many Muscles, the Fracture is not so easy to be discerned. And when only the *Fibula* is broke, the Patient is generally under much less Disorder: In such a Manner, that it frequently permits them to walk. But to obtain a proper Knowledge of the Disposition of this Bone when it is fractured, the Calf of the Leg is to be grasped by one Hand, whilst the other Hand moves the Foot; and in the mean Time the Hand which holds the Leg will perceive whether and where it is fractured.

II. If as it frequently happens, a Fracture of the *Tibia* should be accompanied with an external Wound of the Skin; this must be first well cleansed, and the Splinters of Bone, with all foreign Bodies, removed: Then, the broken Bone, after a proper extension, may be reduced into its right Place, the Hæmorrhage, if there be any, may be afterwards stopped, (as we shewed at *Chap.* VIII. § XI.) and the Limb then be bound up firmly with the eighteen-headed Bandage, cut somewhat in the form of a Book, as at *Tab.* IX. *Fig.* 4. which we shall demonstrate more fully hereafter in *Chap.* VIII. of Bandages. But if any Fragments of the Bone should stick out so as to obstruct its Reduction, they should be first removed by a Pair of sharp *Forceps*, or a fine Saw, before any Attempt be made to reduce or bind up the Fracture. Having proceeded rightly so far, the last Step is, to place the Limb in a Straw Case, or else in a Brass Frame (*Tab.* IX. *Fig.* 9.) purposely accommodated to retain Fractures of the *Tibia*; renewing the Dressing and Bandage daily, 'till the Wound be healed. Sometimes little Pieces of the Bone will be set at Liberty and exposed to Sight

the Suppuration, in the Course of the Cure; which are to be then laid hold of, removed, and the Cure continued as before. An Example of a fractured *Tibia* with a Wound may be seen in *SCULTETUS*, *Obs.* 82, and 84.

PETIT'S
Machine for
these Frac-
tures.

III. A very useful and proper Machine or wooden Case for retaining the preceding Fracture has been also contrived and described by *MONS. PETIT*, a celebrated Surgeon of *Paris*, first in the *Act. Acad. Reg. Paris. Ann.* 1718. and afterwards in his Treatise of *Diseases of the Bones*, from whence *GARENGEOT* transferred it into his Book of *Chirurgical Instruments*. We chuse to exhibit the Machine rather from the *Act. Reg. Paris.*^a than from the Inventor's *Book on the Bones*, or *GARENGEOT's* of *Instruments*; because in the two latter, the Instrument is represented only put together, and therefore may not be intelligible to some, as if exhibited in a double Light, according to the other. You have it therefore first whole or put together, in *Tab. IX. Fig. 11.* and then separated into its component Parts at *Fig. 12.* The Basis or principal Part of the Machine *AA* (*Tab. IX. Fig. 12.*) is to be gently put under the broken Leg (after it has been first set, the Wound properly dressed, the whole bound up with the Bandage of eighteen Heads, and defended with Splints tied on with three Strings, as is usual.) The two lateral Parts of the Case *BB*, and its Front *C*, which serves as a Sole to the Foot, are fastened together by the Hinges *DD*, and kept shut by the Hooks *EE*, as may be seen at *Fig. 11.* by which Means the Foot cannot slip or shake, but is held firm and easy to the Patient. *FF* is the lower Part or Foot of the Machine, serving as a Foundation to the rest. At its End *GG*, it is joined by Hinges to the preceding Floor *AA*, whose sloping Part slides under the Thigh. Over the Floor *AA*, Pieces of strong Tape or Ticken are to be nailed tight to the Sides, upon which the Limb rests easier than upon the Plank or Board. The other Parts of this Case seeming to be very obvious from the Figure, we shall, for Brevity, omit any Explanation of them, and only observe that its Size is to agree with that of the Limb. But by reason of the vast Numbers of Fractures which happen in a War, and the great Scarcity and Cumbersomeness of these Machines at such Times, the Camp Surgeons are generally obliged to substitute Cases of Straw in the room of them. At every Dressing of the Limb, if *PETIT's* Machine be used, the Hooks *EE* are to be undone, and the three Sides opened: But when the Wound and Fracture are dressed and bound up, the Foot must be exactly placed and the Case fastened as before.

Fractures of
the Bones of
the Feet.

IV. Lastly, the Bones of the Foot, which compose the *Tarsus*, *Metatarsus*, and Toes, are equally liable to Fractures in the same Way with those of the Hands: But by reason of the great Complication of Nerves, Tendons, Ligaments, and Membranes, Fractures in this Part are usually attended with Wounds and the worst of Symptoms, as Inflammations and Gangrenes. The Bones are to be replaced, and the Cure carried on much in the same Manner also; except the Difference of Bandage, which we shall explain when we come to the particular Doctrine of them^b: This we may also observe in the general, that Fractures of the Feet, like those in the Hands and Ankles, can seldom be so

^a Tho' it is a great Pity that the Author has not there subjoined a particular Explication of his Figures by annexed Letters or Numbers; because it is probable that some Parts will not be rightly understood by many.

^b See *LE DRAN's Chirurgical Observations*, 108.

perfectly cured as to leave no Stiffness nor Want of Motion behind, if they should escape the Company of an Ulcer, *Caries*, or incurable *Fistula*. Which last bad Symptoms are often to be remedied by no Means but that of amputating the Member, nor will even that always preserve the Patient from Death; and the injured Part should be carefully guarded against Inflammations and Gangrenes, by proper Medicines; particularly, Fomentations of Lime-water and Spirit of Wine camphorated: Nor should you by any means omit Bleeding and the additional Application of internal Remedies. 'Tis one's Interest, therefore, in violent Fractures and Contusions of this Part, to give timely Intimation of the Danger to the Patient, or at least to his Friends: Lest the miserable Condition of the Patient should be afterwards rashly attributed to some Misconduct in the Surgeon, as they too often are. But if any body be desirous of a larger Acquaintance with Fractures of the Bones, I must recommend to him the diligent Perusal of the celebrated PETIT's Treatise on *Diseases of the Bones*.

CHAP. XI.

Of Bones broken by sharp pointed Instruments, which may be termed
WOUNDS of the BONES.

I. **H**ITHERTO we have been treating of Fractures of the Bones, occasioned by blunt Instruments. It remains now that we consider such as are produced by sharp ones, as Darts, Swords, Spears, &c. which may not improperly be called Wounds of the Bones; for which Reason few Writers have treated of them separately. For these Weapons do not only cut asunder and separate the soft and fleshy Parts, but do also the same to the hard Bones, which they divide sometimes slightly, sometimes greatly, and often they make a Solution equal to a Fracture: But these Wounds cannot be inflicted upon the Bones without being attended with a great Variety of Symptoms, which are often very grievous, according to the Size and Depth of the Wound, the Nature of the Part, and the Force with which it was inflicted; as whether the Violence be received in the Head, Nose, Jaws, Fingers, Hands, Arms, Shoulders, Legs, or Thighs. As therefore the Knowledge of these Accidents is of great Importance, and as they require a somewhat different Method of Treatment from other Fractures, it was here proper to say something in particular of the best Method to be taken for their Cure.

Wounds of the Bones.

II. But before we proceed to the Method of Cure, it must be first observed, that such slight Wounds as do not penetrate deep into the Bone, are generally not so very dangerous: Especially if we proceed regularly in the Cure, keeping the Bone covered as much as possible with its Integuments from the Action of the Air, and wholly reject the Use of fat or oily Medicines, as very prejudicial to the Bones. But when they penetrate deep, wholly divide the Bone and its adjacent Parts, or violently affect any Organ more directly necessary to Life, in the Head, Neck, *Spina Dorsi*, and Breast, with a Puncture or Division of the larger Veins, Arteries, Nerves, and Tendons of the upper or lower Limbs: The Danger is then much greater, and the Cure more difficult, Death being often the Consequence.

Their Prognosis.

XIII. In

The Method
of Cure.

III. In the Cure of these Fractures by sharp Instruments, PETIT inadvertently advises, in his Treatise on *Diseases of the Bones*, though in other Respects a very good Surgeon, "That in this Kind of Accidents in the Bones, if the Solution be inflicted lengthways, the Lips of the Wound are to be closed together, and cured with the uniting Bandage; but such as are inflicted very obliquely, or wholly transversely, are to be joined together by Suture and the Bandage that has eighteen Heads." But as this Method is unsuccessful in many Wounds of this Kind, and so might lead young Practitioners out of the Way, it will not be improper here to expound this Matter more fully, and set it in a clearer Light. Indeed in the first Kind of these Wounds I do almost agree with him; especially when they are slight, as when the Skull is not wholly nor deeply penetrated, and without Contusion, nor the Brain much hurt, as we have observed in Wounds of the Head, *Chap. XIV. N. II.* But when the contrary of these obtains, we must proceed more cautiously, and in a Method very different, keeping the Wound open with Lint, cleansing it, and when cleansed, healing it with Balsams, as we have observed in treating of Wounds. For by a too speedy Closure of such Wounds, the most violent Symptoms, and often Death itself, have been frequently brought on. So also in the slighter Wounds of this Kind, which are inflicted obliquely or transversely, I do not approve, with PETIT, of using promiscuously the Suture and eighteen-headed Bandage: But on the contrary, instead of a general Use, I think them the most seldom necessary. For I have seen cured by others, and have often cured myself, many of those Wounds in the Bones without the Use of that Bandage or Suture. To make the Thing more apparent by Example; in oblique Wounds of the Head, Forehead, and *Cranium*, which are none of the violent Kind, the Parts may be retained and closed much easier by a Plaster and common Bandage, than by Sutures made with Needles and Thread, as PETIT seems here to direct; and still much less occasion is there for the Bandage with eighteen Heads. But as I have said in the Chapter of *Wounds in the Head*, these are generally more easy to cure by agglutinative Powders, Balsams, and Plasters, whether the Bones wounded be the Jaws, Clavicles, Shoulder-blades, or in the upper or lower Extremities. But when the divided Part hangs down, so as not to be kept rightly rejoined to its Opposite by these Means, the Suture then seems altogether necessary.

Wounds of
the Finger
Bones.

IV. If the Bones of the Fingers should be thus wounded, or wholly divided by a Sword, so as only to hang by the Skin and Flesh; I have happily cured them, without the Suture and eighteen-headed Bandage, in the following Manner: I first accurately replaced the divided Bone, and retained them joined together in that Posture by winding round a Slip of Plaster, then applied a Compress dipped in *Sp. Vin.* laying over little Splints of Paste-board for the Retention of the broken Bones in their right and natural Posture; and, lastly, I bound up the whole firm with a proper, long, and narrow Bandage, suspending the Hand in a Sling, hung about the Neck for that Purpose. This I left so for several Days, ordering nothing more than for the Patient to keep up to a proper Diet and Rest. At length I carefully undid the Bandage, and tenderly removed the Compress, but not the Plaster, still supporting the Finger in its right Situation; and after cleansing the Wound as well as it would admit, I dropped in some vulnerary Essence, and applying a fresh Compress dipped in *Sp.*

Sp. Vin. bound it up again as before. Thus it was again left for several Days more, and in about every three Days it was dressed in the same Method, till after the Space of about a Month it was quite firm and well.

V. If either of the Bones of the *Cubitus* is divided, it generally happens to be the *Ulna*, that being most exposed to the Weapon in fighting; nor does it then require either the forementioned Suture or the Bandage: But the Wound being cleansed, is to be treated with some vulnerary Essence or Balsam, and with Lint dipped in the same Essence; after which, are to be laid on in order the Plaster, Compress, and Paste-board Splints wetted with *Sp. Vin.* which are to be bound round the thick Part of the *Cubitus* near the Wound with a long Bandage, that, as they dry they may accommodate themselves the better to the Figure of the Part: And lastly, the Arm is to be suspended in a Sling hung as usual about the Neck. And thus dressing the Wound every other Day, or, in Proportion to the Discharge, every Day, a Cure may be brought about without any Suture, which I here judge to be pernicious. But when either of the Bones of the Leg are broke, I do then indeed use the Bandage with eighteen Heads, as in other Fractures of the Leg and Thigh; but scarce ever the Suture: Because there is seldom or never occasion for it in Fractures of the *Tibia* alone, which is covered with scarce any thing more than the Skin: And it is extremely rare that it is required in Fractures of the *Fibula*, unless some of its large Muscles are divided. For we should refrain from the Use of Sutures as much as possible, because they generally excite Inflammation, Pain, Convulsion, and other bad Symptoms; so that we cannot approve of their Use, but in the greatest Necessity where we perceive the Cure of the Wound cannot be effected without.

VI. If the Thigh Bone should be cut by a Sword, then the better to close and retain those strong Muscles, a Suture made with Needles and Thread, as in some other Wounds (*Book I. Chap. I. § XXXIII and XXXIV.*) will certainly be of Service: The Wound is to be treated in the Method we have there taught, bound up with the eighteen-headed Bandage, and the Limb is to be placed carefully in a Case of Straw, as in other Fractures. So also if the Bone of the *Humerus* or Arm should be penetrated by a Sword, it should, for the same Reason, be treated with the Suture as before; yet not dressed with the eighteen-headed Bandage, but a long and narrow one, as in other Fractures of the Arm. The Arm is afterwards to be supported by a short Napkin, fastened about the Neck; by which Means the Muscles will be brought to a more ready Union, and the Cure sooner and easier perfected. When we find the fleshy Parts are united, the Threads must be cut, and drawn out, as in other Sutures: For the rest, we proceed, as in all other Fractures of this Kind.

VII. If it should at any time happen that both the Bones of the *Cubitus* or *Crus* are divided, so as to leave the Member hanging only by the Flesh, Skin, and Blood-vessels, (which is an Accident that very rarely happens without wholly amputating the Limb) then also the Suture with the eighteen-headed Bandage is to be applied. But the Suture can be of no Service when the Part is wholly or so far cut off as to hang by the Skin, its Nerves and Blood-vessels being divided; especially when the Part is so considerable as the Leg or Arm. For in that Case it is much the best to take the Limb quite off, to stop the

violent Hæmorrhage of the Vessels, as in other Amputations, and to dress the Member in the same Manner.

Wounds of
the Jaw-
Bone, Clavicles, and
Scapulae.

VIII. When the lower Jaw is so cut by a Sword, that the Piece separates much, and cannot be otherwise properly retained, then also the Suture must be brought into Use; adding a proper Balsam, Plaster, Compress, and suitable Bandage. If the Clavicle, or *Acromium Scapulae*, should be in like Manner wounded by some sharp Instrument, the Treatment and Bandage are to be performed in much the same Manner; gently unbinding, cleansing, and dressing every other, or every Day, as we have observed in the rest of these Accidents, till the Cure is perfected.

IX. The Hæmorrhage, which in these Injuries is often very large, must be stopped by Compresses, Astringents, or Ligature upon the Vessels, according as which may seem most suitable to the Case. Gun-shot Wounds of the Bones are to be treated in the same Manner; or like Fractures. See further on this Subject, *Ch. III. of Gun-shot Wounds*; and in my Treatise of *Wounds of the Bones*.

AN EXPLANATION of the NINTH TABLE.

Tab. IX.

Fig. 1. Is a Compress folded together by Degrees, called by the *French Compressse graduée*, to be applied in Fractures of the Thigh, to make its small Part towards the Knee of the same Thickness with its other, that the Splints may act more equally upon it by the Bandage.

Fig. 2. Is two lunar Plasters, to include and hold firm the fractured Knee-pan after it has been set.

Fig. 3. A perforated Plaster for the same Use.

Fig. 4. Is a Fracture of the Leg, with an external Wound A, to be bound up with the Bandage of eighteen Heads BBBB; which commodious Kind of Bandage seems to have been unknown to the Antients.

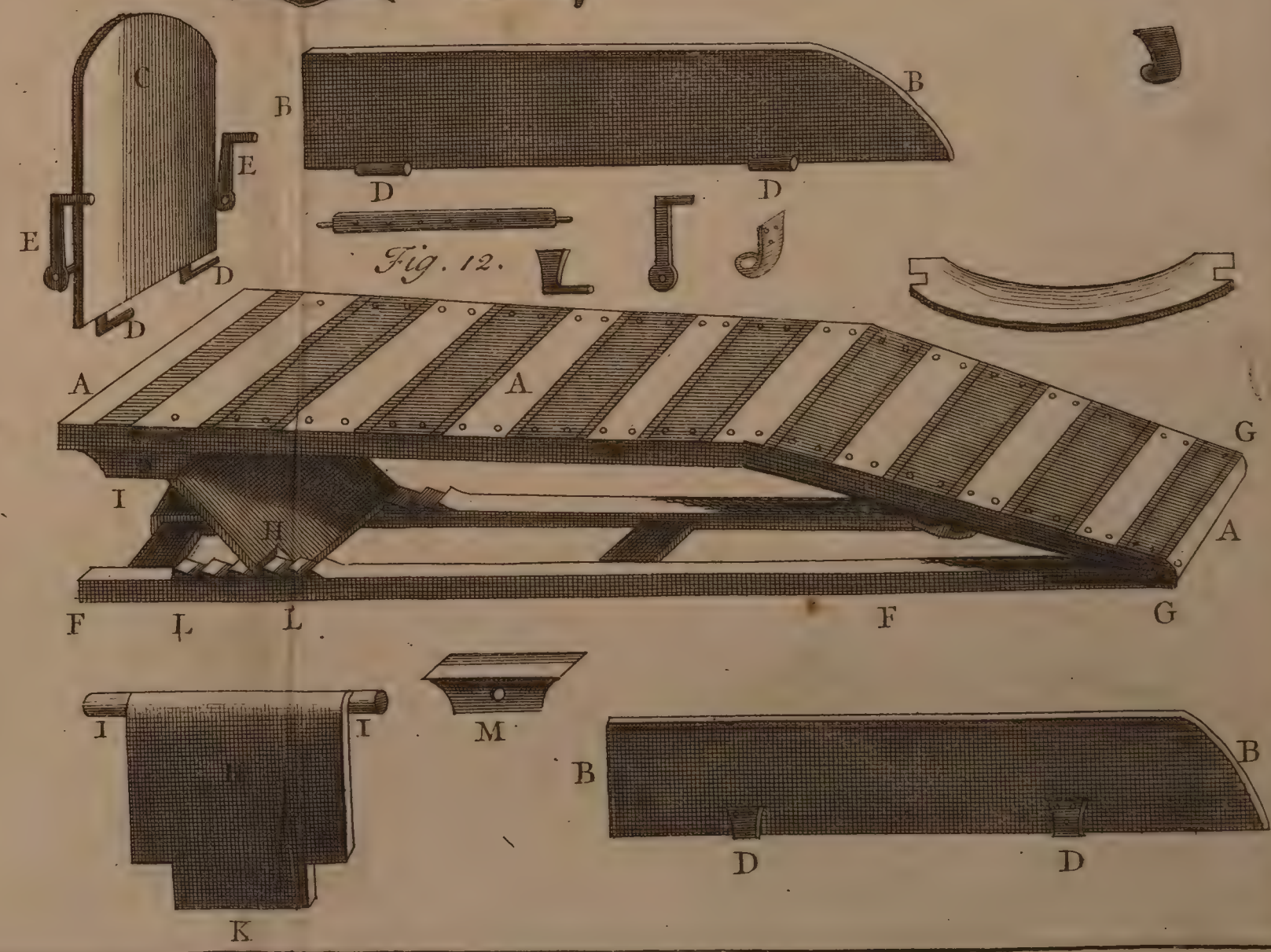
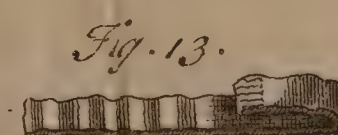
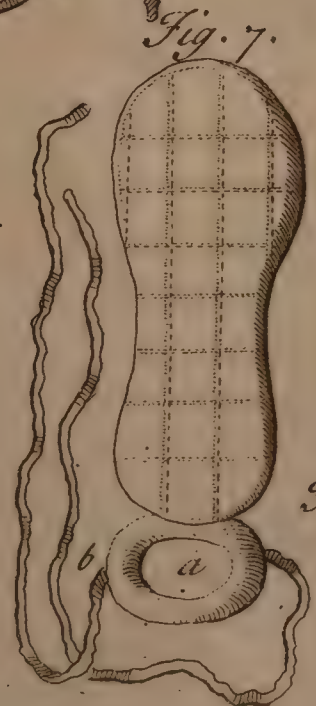
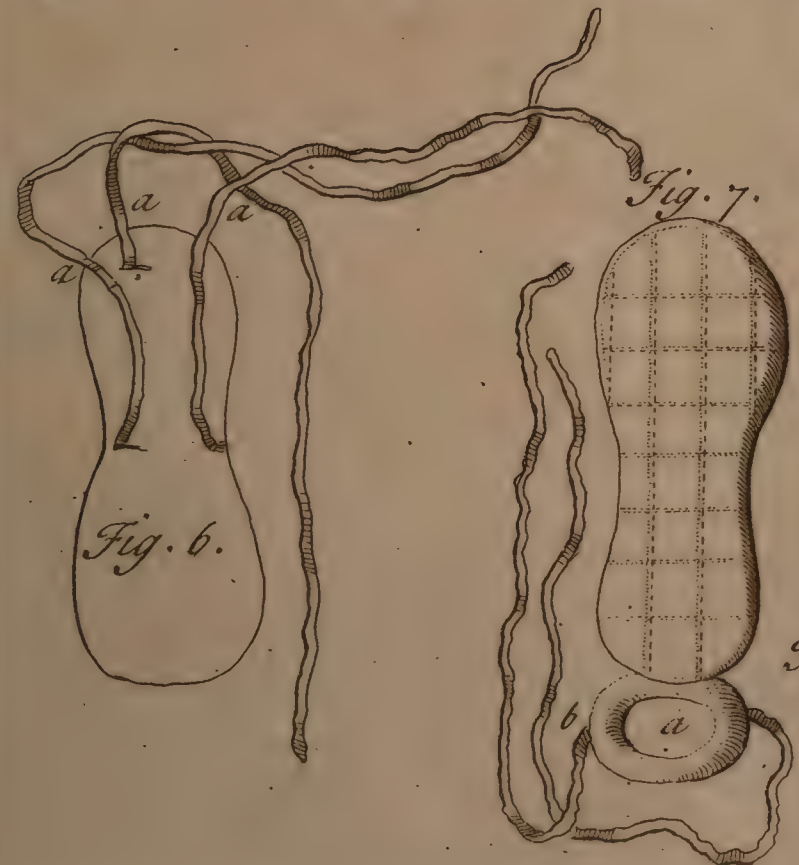
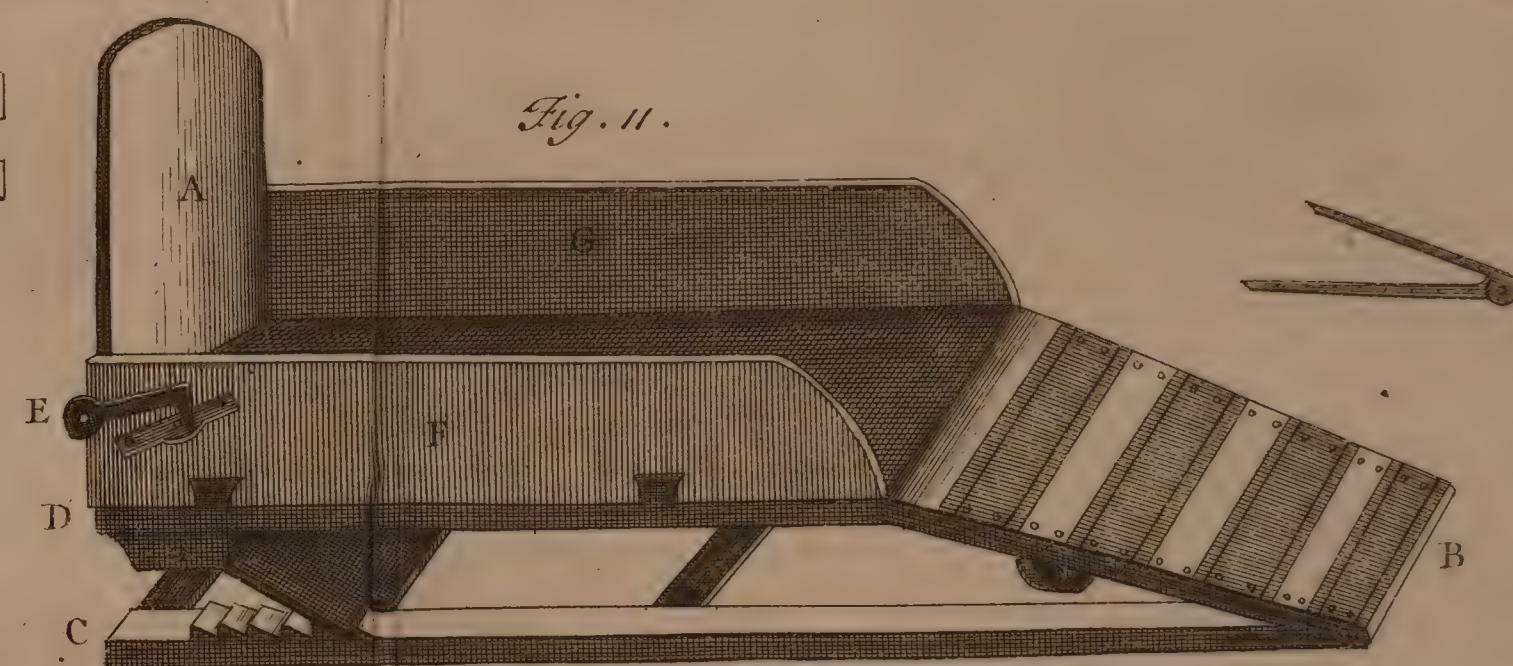
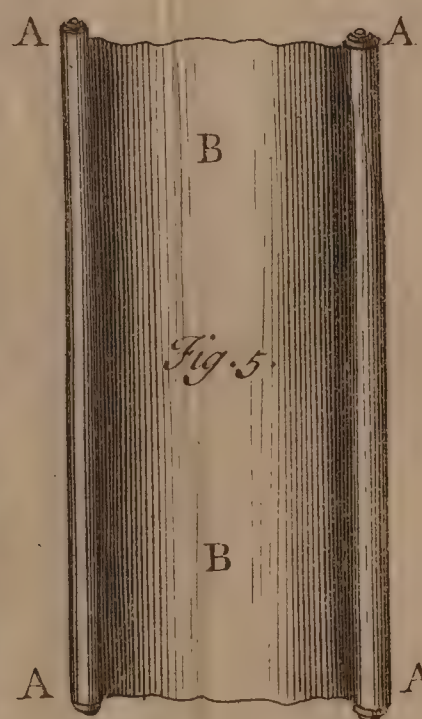
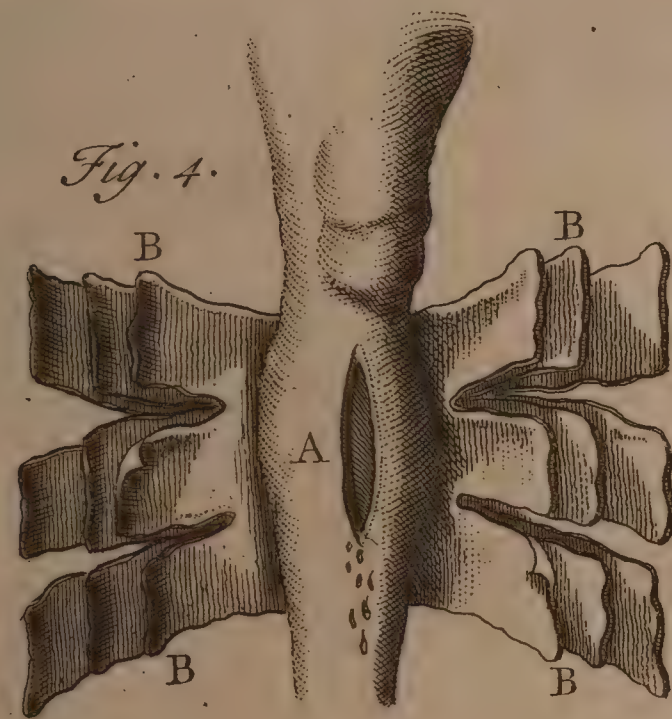
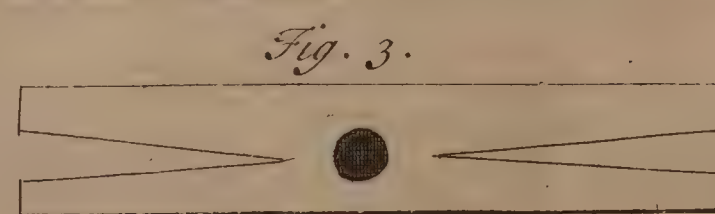
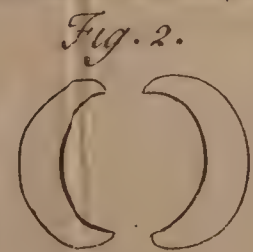
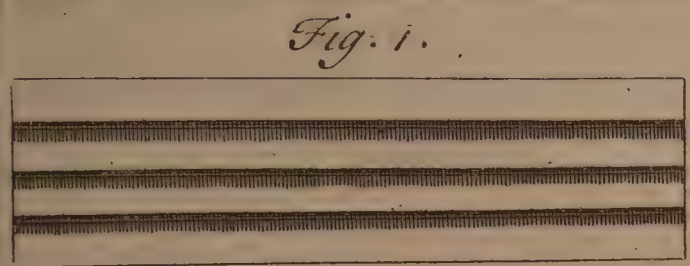
Fig. 5. Is a Straw Couch or Case for a broken Thigh, called by the *French Fanons*, the Letters AAAA denote two Sticks covered with Straw, bound on with strong Packthread: To both Sides of these is also fastened a strong Cloth BB, of about two Feet broad, and three long. This Couch is usually made twice the length of the Thigh, so as to reach from the Groin and *Os Ilium* to the End of the Foot.

Fig. 6. Is a Sole of thick Paste-board or Wood, fitted to the Size of the Patient's Foot: It is to be applied to the Bottom of the fractured Foot, and bound on by the three Tapes *a a a*, to retain or stay the Foot in its proper Position; whence *Celsus* calls it *Mora*.

Fig. 7. Is a quilted Compress to be applied between the Foot and the Stay, to be soft, and defend it from any rough Action of Paste-board or Wood.

Fig. 8. Is a soft Linen Ring joined to the foregoing Compress, to let in and hold the Heel: It is to be fastened to the Foot by the two Tapes *b b*.

Fig. 9. Is a Brass Trunk for securely retaining a broken Leg: It consists of three Parts ABC, which are joined by the Hinges 1, 2, 3, 4, 5, 6. The Middle Part B is the Basis or Chief of the Machine, which, like an hollow Pipe, receives the bound-up Limb: The outer Parts A and C are as moveable Lids or



or Wings, which may be turned back or folded together: To each of these Lids AC, are joined three almost square Loops E E E, through which are passed Tapes to draw them tight together, and keep them firm upon the fractured Leg. Its Size must agree with the Leg.

Fig. 10. Is a wooden Arch to put over a broken Leg, to keep it from being disturbed by the Bed-cloths, &c.

Fig. 11. Is PETIT's new Machine Case, (in *French Boette*) or a Box, for retaining a broken Leg, after it has been set and dressed as usual, It is described fully at Chap. X. § III. of *Fractures*.

Fig. 12. Is the same in Pieces, to shew its Structure the better. The Letter M denotes the perforated Bracket, which receives the wooden Axle or Hinge II, that it may be elevated or depressed. The rest are sufficiently explained above at Chap. X. § III.

Fig. 13. Is a Compress folded at one End, to fill up the Small of the Leg, that the Splints may compress the more equally and firmly.



INSTITUTIONS OF SURGERY.

PART I. BOOK III.

CONCERNING LUXATIONS, or LUXATED BONES.

CHAP. I.

Of LUXATIONS of the BONES in general.

What a
Luxation is.

I. **H**ITHERTO we have treated of Fractures of the Bones. We shall now proceed to Luxations, or, according to CELSUS, Dislocations. We say a Luxation or Dislocation has happened when any Bone is moved out of its Place or Articulation, so as to impede or destroy its proper Motion and Office. So, for Example, we judge there is a Luxation when the *Acromion* is loosed from the Clavicle, when the Head of the *Humerus* is slipped out of the glenoeide Cavity of the *Scapula*, or the Head of the Thigh-bone pushed out of its *Acetabulum* by some Violence, &c. So that it hence appears that Luxations are proper only to Bones that have moveable Joints or Articulations; but in a common way of speaking, People term it a Luxation when the Bones of the Nose are displaced, or when *Epiphyses* are separated from their Bones in Infants, whereby they lose their natural Use. And, indeed, CELSUS has ranked these Recesses of the Bones from each other under the Class of Luxations.

What is re-
quired previ-
ous to their
Discovery
and Cure.

II. From what has been said of Fractures, it may be easily concluded what is necessary to be done by those who desire to be happily versed in the Knowledge and Cure of Dislocations. First, that they should have a clear Idea and Remembrance of the Form of each Articulation, with their Ligaments and Muscles: Which may be in some Measure obtained from accurate Figures in Anatomical Books, but rather from a frequent and diligent Inspection of the Skeleton and recent Bodies. For the Ligaments and Cartilages which are absent in the bare Skeleton, may be fully observed, in their natural State, in a recent Subject.

III. Luxations

III. Luxations are generally distinguished by Physicians into *Perfect*, and *Imperfect*. The imperfect consists chiefly in this, that the Bones are here dislocated or removed out of their Places but in part, yet so as that they cannot perform their Office. Some are for distinguishing this Kind of Injury by the Name of *Subluxation* or *Distortion*. But the perfect Luxation is, when moveable Bones are wholly separated or displaced from their Articulation with each other: As when the *Humerus* or Thigh-bone is removed quite out of its Socket. In both these Kinds of Luxations the Bone may slip out in several Directions; as externally or internally, behind or before, and above or below. Another considerable Division of Luxations, is, into *Simple* or *Compound*: The latter when besides the Dislocation there is some other bad Symptom, as a Wound, Fracture, Weakness or Straining of the Ligaments, Contusions, violent Inflammation, or the like: But in the first there are none of these. The last Division of these Injuries is into *Recent*, or just inflicted, and *Inveterate*, or of some standing. The more free and moveable the Bone is in its Articulation, the more subject and easy to be dislocated. So that it is no wonder if the Bones of the Arm are oftner displaced from their Articulations with the *Scapulæ* than those of the *Cubitus* and Wrist, and the *Vertebræ* of the Neck and Loins oftner than those of the Back.

Of the several Kinds of Luxations.

IV. What we have been saying is in common to all Dislocations. But it remains that we describe every particular Kind of Luxation, beginning with the Head. We may suppose the Head to be luxated when (1.) the Bones of the Nose gape; or (2.) when the lower Jaw stands in or out further than the upper; but it cannot be easily shoved out backward, because hindered by a Protuberance of the *Os Petrosum*; or (3.) when the Head with the *Vertebræ* of the Neck are distorted to one Side, as it may have been sometimes observed by the Surgeon; or, lastly, (4.) when the Bones of the *Cranium* are forced apart by violent Pains, Fever, or Dropsy in this Part.

Luxation of the Head.

V. Tho' all the *Vertebræ* which compose the Spine have a proper Motion, they are none of them easily removed wholly out of their Places, so as to make a perfect Luxation. But the *Vertebræ* of the Neck are much easier displaced than the rest, because smaller and more moveable; tho' these are generally connected very closely and strongly to each other and the larger *Vertebræ*. So also the *Vertebræ* of the Loins are extremely difficult to dislocate, tho' more moveable than those of the Back, being separated by thicker Cartilages, and without Sinuses. Lastly, the *Os Coccygis* may be shoved outwards in hard Births, and is sometimes displaced and bent inward by a Fall or the Force of some other hard Body: By which means it presses on the *Rectum*, and very bad Symptoms follow.

Luxation in the Spine.

VI. As the Breast is made up of various Bones, so it is also subject to various Luxations. Thus the Ribs may by some violent Blow or Fall be shoved from their Articulation with the *Vertebræ* into the *Thorax*, to the great Damage of the Breast and Lungs. Sometimes it happens that the ensiform Cartilage, at the Bottom of the *Sternum*, is depressed or thrust inward by some Violence, so as to greatly afflict the Stomach^a. The Clavicles are also sometimes dislocated

Luxations of the Breast.

^a See CODRONCHIUS, of Diseases reigning at Imola, &c. An. 1602. and a new Distemper, called, *The Depression of the ensiform Cartilage.* Bonon. 1603.

at one or both their articulated Heads, those joined to the *Sternum*, and those to the *Scapula*, but mostly the first: Which, whenever it happens, the Arm hangs down unsupported, and its Motion obstructed.

Luxation of
the *Humerus*.

VII. If any one Bone is to be easily dislocated, it is that of the *Humerus*, partly because its Head is not lodged in any deep *Sinus*, and partly from its very ample and free Motion. It may be forced out either before, behind, or downwards; but never upwards, without breaking the *Acromion* or coracoid Process; for these confine down the Head of the *Humerus* very firmly above. Though the *Cubitus* does, at times, undergo various Luxations, it can seldom happen unless the Violence be great: And then it usually suffers only an imperfect Luxation; from the Shortness of the Ligaments, the Deepness of the Articulation, and its external as well as internal Defence with Ligaments. For the *Cubitus* to be luxated forwards is hardly ever the Case, being prevented by the Protuberance, *Olecranon*: But then it easily and frequently slips out backwards; as from duly considering the Articulation will be very apparent.

Luxation of
the *Cubitus*.

Luxation of
the Hand.

VIII. The Wrist is very seldom dislocated from the Bones of the *Cubitus*, and hardly ever suffers more than an imperfect Luxation, from the Shortness and Strength of its Ligaments. But if it should be luxated, it will much easier slip out backward and forward, than inward and outward. The Reason of which is not difficult: For there is a bony Process on each Side the *Carpus*, where it is articulated to the *Radius* and *Ulna*, which defends it from being easily displaced. Sometimes the small Bones of the *Carpus* are subluxated among themselves, whence generally arises an Extension and Stiffness in the Hand. In like Manner may the Bones of the Fingers be displaced; but then they are more easily reduced and cured.

Luxation of
the Thigh.

IX. Among Luxations of the lower Extremities, that of the Thigh-bone comes first to be considered. The Head of the Thigh-bone may be forced out either upwards, downwards, forwards, or backwards: But which of these Ways it happens to be displaced, may be determined generally from the Touch, and from the different Direction and Length of the Limb. What we have before taken Notice of (*Book II. Chap. VIII. N. VI.*) is also here worth fresh Observation; viz. that the Head of this Bone is not near so often pushed out of the *Acetabulum* by some external Violence, especially in grown Persons, as is commonly suspected. For the modern Surgeons, contrary to their strong Opinion of a Luxation, have generally found a Fracture in the Neck of the Thigh-bone. Nor is this to be wondered at: Since the Head of this Bone is articulated into so deep a Socket, and secured by such strong Ligaments, that it cannot be dislocated in a dead Subject by the strongest Man or other Violence. Whereas, on the contrary, the Neck of this Bone is found to be very small, infirm, and brittle: So that it will be much easier for the Neck thereof to be broken, than its large Head to be forced out of its Socket. The Reason why this Fracture has been so commonly taken for, and treated as a Luxation, seems to be owing to the close Concealment of this Part by so many thick Muscles; and on that Account the *Trochanter Major* has been frequently mistaken for the Head of the Thigh-bone.

A Luxation
of the Thigh-
bone usually
happens
from an in-
ternal Cause.

X. From what has been said, we may perceive the Reason why the antient Surgeons had generally such bad Success in reducing this their supposed Luxation, scarce ever making a Cure without laming the Patient: To say nothing

of

of the Torture and bad Consequences of their improper Extensions by Machines. They thought their not being able to reduce these Luxations, was, because they could not make an Extension strong enough to overcome the robust Muscles of this Part: Upon which Account, they invented all Sorts of Pullies and strong drawing Machines, whereby they might extend and draw with the greatest Force: Figures of which may be seen in SCULTETUS's *Armamentarium*. But as the Bone was not dislocated, but fractured, all the good they did the Patient was little else than exciting violent Pain, Convulsion, Inflammation, Abscess, and other grievous Symptoms. For nothing is more certain than that a true Luxation of this Bone from external Violence, was scarce ever at the Bottom of any of their Cases, which they, as some now do, suspected to be such: For it is scarce possible the Head of this Bone should slip out of its Socket; unless some great Weakness or Relaxation of its Ligaments, and a Congestion of morbid Humours between the Joint has happened some Time before, by which Means this otherwise very strong Ligament may, by degrees, be so elongated and relaxed, as easily to give way to some future external Force, which is observed to happen in Children rather than Adults. In these young Patients the Head of the Thigh-bone generally falls inwards toward the great Aperture of the *Os Pubis*, and can seldom be replaced: It most commonly adheres to that Bone; and the Children who labour under this Complaint, if properly supported by strengthening Medicines, are yet able to walk, though not without limping.

XI. A Dislocation of the Knee-pan is seldom discoverable by an unskilful Surgeon, especially when the Motion of the Bone, from its natural Seat, is very easy and large. For if he be destitute of anatomical Skill in the Joint, there is great Danger of his treating it for a Dislocation of the Knee, tormenting the Patient with Pain from an useless Extension. But such as have before duly considered the natural Disposition of these Bones, will readily perceive whether the Dislocation be of the *Patella*, or of the Knee: For the Knee-pan is always pushed either without or within-side the Joint. But for the Knee itself, though the Head of the *Tibia* may be forced on either Side that of the Thigh-bone; yet, as the Articulation is very broad and grooved, being defended and held fast by exceeding strong Ligaments, it never happens to be perfectly luxated.

Luxation of
the *Patella*
and Knee

XII. The Foot, indeed, is not exempt from being pushed out before or behind from the *Sinus* of the *Tibia*: But it cannot be dislocated on either Side, because prevented by the two Heads of the Bones which form the Ankle, unless they should chance to be broke at the same Time. The lower Head of the *Tibia* may be sometimes separated by a great Force from that of the *Fibula*, and the Foot may at the same Time be dislocated outwards, as we read in some Observations. CELSUS has treated of this Species of Luxation, *Book VIII. Cap. 11*. The Bones of the *Tarsus* are connected to each other by very strong Ligaments, and so cannot be easily dislocated: But they are sometimes so violently strained, as to occasion most sharp Pain, Convulsion, and *Sphacelus*, unless prevented by timely Assistance. Lastly, the Toes are seldom luxated; but if they should, they must be treated like the Fingers.

Luxation of
the Foot

XIII. The *Causes* of Luxations are either external or internal. The *external* are Falls, Blows, Leaps, Strugglings, and such like. The *internal* are preternatural Congestions in the Articulations: As when morbid Humours gather and

The Causes
of Luxations

relax the Ligaments, so as to make the Joint dislocate of itself, or by a Force not much greater, as rising up, walking, leaping, &c. a sad Instance whereof, I saw in a Student at *Altorf*. And another Instance of the same Kind I remember in the Manager of a considerable Farm, who frequently dislocated his Shoulder-bone from a very slight Motion of his Arm. The weaker Men are, the more subject to this Sort of Luxation. Hence it is that the Bones in the Limbs of Infants are so easily distorted, and wholly separated from their *Epiphyses*, upon a Fall, or rough handling. It is also worth observing, that ZWINGER (*Theat. Pract.* II. pag. 109.) knew a lame Woman that bore three lame Sons.

The Signs of Luxations.

XIV. Many and various are the Signs of Luxations of the Bones: As from (1.) The want of Motion in the Joint. (2.) The Change of Figure or natural Posture of the Limb. (3.) An unusual Hollowness or Protuberance, there being always a Tumor on that Side where the Bone is out, and a Cavity on the other where it came from. (4.) From the Difference of Length in the Limb, which is usually shorter when the Bone is dislocated upwards, and longer, when downwards; or lastly, (5.) from the Pains excited by the violent Distortion of the Ligaments. For unless the Dislocation be speedily and rightly reduced, it is scarce possible but there must follow violent Convulsions, Inflammations, *Sphacelus*, and Death itself, merely from the vehement Distention of the Ligaments. But when the Bone is gradually thrust out of its Place from internal Causes, then there is scarce any Uneasiness perceived. In the mean time, to make a more ready Discovery of Dislocations in general, it may be very proper to have in Readiness an universal Rule; viz. *That whenever the Head of any Bone is removed out of its Place, its other End will be distorted in an opposite Direction*: When the upper End of a Bone is thrust inward, its lower one will stand outwards, and when the first is outwards, the latter will be bent inwards.

The Signs proper to particular Luxations.

XV. Tho' these common Signs of Luxations, with a Knowledge in the Mode of each Articulation, may be generally sufficient to discover most Dislocations: (as, for Instance, where there is a Luxation, you will feel a Cavity and a *Sinus* by pressing your Finger upon the Place; and, unless it be soon reduced, a Swelling and Inflammation will ensue) Yet we ought not to be ignorant of several other Signs which are proper to some Luxations only. Thus in a Dislocation of the lower Jaw, the Mouth gapes open and cannot be shut by the Patient. When one *Vertebra* is pushed over another, all the Parts beneath it are deprived of Sense and Motion: For none of the *Vertebrae* can be dislocated in any manner, without compressing or wounding the *Medulla*, which is transmitted through their Middle, in Consequence of which, the Course of the Spirits through it and its Nerves to the lower Parts, will be either disturbed or wholly intercepted. When one of the Ribs is dislocated, the Breath is very difficult to be drawn, and other bad Symptoms of the like Kind arise. But to open at large the peculiar Signs of every other Luxation, is not the Business of this Place: Especially as they may be readily deduced from the Action of each particular Part where they happen.

Signs of imperfect Luxations.

XVI. A Subluxation or Strain may be discovered, when the Patient has suffered under some great external Violence, and the particular Joint is afflicted with Immobility and violent Pains, the natural Figure or Position of the same being little or nothing changed. But however, upon a more strict Examination

tion of the Part affected, there may be almost always found some little Inequality in the Articulation or Limb.

XVII. Lastly, Luxations which proceed from internal Causes may be known from the following evident Signs: (1.) The Limb is so much relaxed as to be easily turned about in any Direction. (2.) There will be a Cavity about the Place of the Articulation, and the Fingers will perceive a Hollowness upon pressing them between the Bones, and a preternatural Swelling will appear in another Place. (3.) The Bone that has slipped out may be easily replaced, but then it soon falls out again of itself; so great is the Weakness of the Ligaments and Muscles, that they are not able to keep the Bone in its right Place. Hence, (4.) the dislocated Limb will be longer than the sound one. It is also (5.) generally not accompanied with any Pain, Inflammation, or Convulsion, as is usual in other Luxations. Lastly, (6.) from the Seat of this Luxation, being generally in the upper Joint of the Thigh or Arm, and sometimes in the Articulation of the Foot with the *Fibia*.

Signs of
Luxations
from inter-
nal Causes.

XVIII. If any Surgeon desires to be well skilled in the *Diagnosis* and *Prognosis* of Luxations, I advise him to be well versed in the Structure and Difference of the Parts affected, as well as to compare the Case carefully with the several Causes and other Circumstances of Luxations. For thus we find that *imperfect* and *simple* Luxations are reduced with much more Ease, and treated with much greater Success, than such as are attended with Wounds, Fractures, Convulsions, Inflammations, or the like. The Reduction is not only more difficult in Proportion to the Number of Accidents or Symptoms, but also as the Bones are more or less distant and separated from each other: Insomuch, that the Bones cannot often be replaced, by reason of the Fracture and great Inflammation; or, if they are once reduced, it is very difficult to retain them in their Places, and perfect the Cure without Lameness, from the great Weakness of the Ligaments: Which last is usually the more certain in Luxations from internal Causes. But in Luxations that happen from internal Causes in very young Subjects, the lower Part of the Limb generally wastes, and becomes altogether weak and flaccid. Luxations that have just happened, are in the general much easier and sooner cured than those of long standing: For in the latter there generally arises a Tumor with Inflammation, and the Juices gather in great Quantity, by which Means the Ligaments are extremely relaxed, or the Articulation so glewed up and obstructed, that it cannot receive the Head of the Bone as before. Nor is it unusual for the Head of the dislocated Bone, in an inveterate Luxation, to lodge itself in some new *Sinus*, on one Side its natural one; by which Means the Head of the Thigh-bone has adhered and grown to the external Part of those of the Hips, or else to its *Acetabulum*; that Cavity itself being filled up with some preternatural and tenacious Juice. It may be observed in general, that Luxations are very seldom mortal, except in the Head, and in the *Vertebræ*.

The Prog-
nosis of
Luxations.

XIX. If any Bone be dislocated in Infants, or separated from some *Epiphysis*, the Case is very dangerous, and usually attended with very bad Consequences. For (1.) the Head of the very soft and cartilaginous Bone is so distorted as to be seldom if ever reducible to its natural Figure. (2.) These Kinds of Luxations are usually concealed by Maids and Nurses, so that they do not come under the Care of the Parents or Surgeon, till it is too late. (3.) The Case of Infants rarely

Luxations in
Infants.

rarely admits of a regular Extension and Reduction of the Part, from the Extremity of Pain, which they are incapable of bearing. (4.) When the Luxation in younger Patients has been of any standing, the Head of the Bone is so enlarged, and the *Sinus* or Socket so contracted, that it is often impossible to render it. (5.) It may happen that the Surgeon, ignorant of the true Cause, will take it to be and treat it as proceeding from a Flux or Humors, often too violently extending those soft and now cartilaginous Parts, and throwing them into some very bad Posture. Lastly, (6.) want of Skill in the Surgeon may be an Occasion of the Bones not being happily replaced in Infants: For nothing is more improper than the violent Distension some Surgeons use in these Cases, whereby they separate those soft Bones and their *Epiphyses* more from each other, and occasion many bad Symptoms.

If attended
with a
Wound.

XX. Dislocations attended with a Wound, especially of the Shoulder or Thigh-bone, are of very bad Consequence, and often endanger the Life of the Patient; in *CELSUS's Opinion, Book VIII. Chap. 25.* whether the Bones be replaced or not, there is generally great Danger; and so much the more, the nearer the Wound is to the Joint. *HIPPOCRATES* has declared that no Bones can be reduced with Security, beside those of the Hands and Feet. *Velliar. 19. 5.*—See more on this Subject, in that Passage of *CELSUS* just now quoted: Though I by no Means recommend the following him implicitly.

CHAP. II.

Concerning the CURE of LUXATED BONES.

The Cure of
Luxations.

I. **T**HE Method of treating Luxations of the Bones does pretty much agree with, and is in a great Measure the same with, that used in Fractures. For in Dislocations, as in Fractures, the whole Design of the Surgeon is, (1.) To restore the luxated Bone to its Place, first by Extension, and then by Reduction with his Hands. (2.) to preserve and retain what is so replaced in their natural Position. And lastly, (3.) To prevent and cure the several Symptoms which usually attend. The Reduction is used to be commodiously performed by placing the Patient on a Stool, Table, Bed, or the Ground, as the Surgeon shall think most suitable to the Case. It is however to be observed here, that those Luxations are most readily reduced on a Stool, which happen in the Jaw, Clavicle, Arm, or Hand: On a Table, such as happen in the *Vertebrae* or Thighs: On a Bed, such as happen in the Legs or Feet: And lastly, those Dislocations are most commodiously reduced on the Floor which happen on the Shoulders or *Vertebrae* of the Neck.

Of (1.) the
Extension.

II. The Extension, as we observed, in dislocated Bones, is to be made much after the same Manner as in Fractures: *viz.* the outer or lower Part of the dislocated Limb is to be extended by an Assistant, till the Head of the disordered Bone be found to correspond exactly with the *Sinus* from whence it was luxated. This may be done by the Hands, but if they are not so convenient, the Extension seldom fails of being made so well by a Napkin, as to render the Machinery delineated in such an ample Manner by *ORIBASIUS, PAREY, ANDREAS A*

CRUCE,

CRUCE, SCULTETUS, and others, generally unnecessary : Since they can effect scarce any thing more, unless it be to terrify and discourage the Patient in the Extension, by their formidable Shew.

III. To replace the luxated Bone again in its natural Seat, the Surgeon must regulate the Assistant's Extension, by ordering it to be strong enough, and in a right Direction ; in the mean Time he is to compress the Articulation gently with his Hands and Fingers, till he find the elaps'd Bone recover its right Place.

Of (2.) the Reduction.

IV. An accurate Reduction of a Luxation is known to have been effected by the same Signs which have been beforementioned in the Doctrine of Fractures. It is a good Sign (1.) if the Bone be heard to snap or crack in its Reduction. (2.) When the disordered Limb is found to be of the same Length with the sound one. (3.) When the Pains grow less. Or lastly, (4.) when the Limb can perform its usual Motion.

How to know when the Bones are rightly replaced.

V. But as Fractures are often prevented from being directly set by being attended with Inflammation, Hæmorrhage, or Tumor ; so also Luxations often cannot be safely reduced before those impeding Symptoms are first removed, or at least much abated, by a proper Treatment. (See *Book II. Chap. II. § XI.*) In such Cases also where the Luxation is accompanied with a Fracture, the Reduction must be put off till that is first set and joined : For the Extension cannot be safely attempted till the Fracture be well joined by a firm *Callus*.

The Reduction is often to be delayed.

VI. After the Bones have been pushed into their Places from whence they were forced out, the next Business is carefully to retain them there. But Bones that are intire are much easier retained than those that have been broken : For the latter cannot be contained in their right Posture without strict Bandage and Rest ; whereas there is in the first Case seldom much Occasion for Bandage, or any great Rest. For thus in fresh Dislocations of the Jaw, Bones of the Fingers, Hands, *Cubitus*, and *Humerus*, the Bone may be immediately reduced without further Bandage or Rest ; because they are generally held firm enough by their proper Ligaments and Muscles. It seems rather more necessary to bend, extend, and gently move the Limb sometimes, than to endanger its becoming stiff and immoveable by a long Inactivity. But when the Luxation happens in the lower Extremities, it seems better to let the Patient rest a few Days in his Bed, moving the Limb gently as soon as he finds it capable, and afterwards he may rise and walk cautiously with it.

How the luxated Limb is to be treated after Reduction.

VII. On the other hand, when the Ligaments have been much stretched by a violent and long continued Distension, or have been rendered infirm by any other means, it seems altogether necessary to make use of some proper Bandage, and to recommend Rest to the Patient, till the Ligaments have regained their former Strength. But here it must be also carefully observed, to let the disordered Articulation sometimes have a little gentle Motion, by an easy Flexion and Extension of the Limb, to prevent any Stiffness or other bad Consequence from such a continued Rest. In the mean Time, it may not be improper to moisten the Bandages and bathe the Part well with *Sp. Vin. Aq. Hungar.* or some other warm and strengthening Spirit, by which Means the Ligaments are used to become very firm and strong. The Bandages themselves should be neither too tight nor too loose : The Reason for which, we have given in *Book II.*

Of an inveterate Luxation.

Chap. I. § XXXIV. treating on Fractures. As for the Application of Plasters, which has been such a prevailing Custom in these Cases, they may be altogether omitted here, as in Fractures, without any Danger: They seem even to do more Service by their Absence than Presence.

Of the
Symptoms
of Luxations.

VIII. The Inflammations, Tumors, Pains, Convulsions, Hæmorrhages, and other such Symptoms which happen before or after the Reduction of a Luxation, are to be treated and cured in the same Method with that we prescribed before in the Cure of Wounds and Fractures, *Book I. Chap. II. § XVII, XVIII. Book II. Chap. II. § I.* But as soon as the Bones are replaced, the forementioned Symptoms generally vanish, by Degrees, of themselves. When the Ligaments are very much weakened, it is extremely useful to bathe the Part, after it has been first well rubbed with hot Linen Cloths, with highly rectified Spirit of Wine set on Fire, using plentifully afterwards some strengthening Spirit, (as at *Book II. Chap. II. § IX.*) and then binding it up with a proper Bandage. But if violent Pains should remain, notwithstanding the Luxation be reduced, there is Reason to fear that there is a Fracture along with it. We must therefore endeavour to be satisfied with regard to this Certainty; and if we find a Fracture, we must use our Endeavours to set it. But if you find no Fracture, you must persevere in applying strengthening Fomentations and highly rectified Spirits; for after considerable Dislocations, (especially in the Knee or Foot, which bear the Stress of the Body) if they are not immediately reduced, the Pains often prove obstinate, are of long Continuance, and require great Patience. If a slight Fever should attend, Bleeding, a thin Diet, and cooling Medicines are to be used. If a Gangrene should appear, which may sometimes happen, it must be treated not only with the Medicines which we have before recommended, but also with Fomentations and digestive Cataplasms, binding up with the eighteen-headed Bandage. For the rest of the Symptoms, they may be treated as we proposed, *Book II. Chap. II.*, always taking Care to let the Dislocation be reduced first. If a Luxation should be attended with a Wound, we must make use of the eighteen-headed Bandage, and proceed with the rest as we have directed in Hæmorrhages, *Book II. Chap. II.* in the Doctrine of Wounds. If in Dislocations attended with a Wound, an Hæmorrhage ensue, you must proceed at the first Dressing in the Method above described, where we treated of Wounds, *Book I. Chap. II.* and the Wound must be healed with balsamic Medicines. If an Abscess should be formed, it will be much the best to open it as soon as ever we find it to be ripe: For else there will be Danger left by the long stay of Matter, it should corrode the Articulation and Bones, and produce the worst Kind of *Fistulæ*, which are often to be remedied by no Means, but that of amputating the Limb. When the Bones are dislocated with so much Violence as to break and destroy the Ligaments, Tendons, and adjacent Skin; the Case is then, as HIPPOCRATES has observed, altogether incurable. For the more we strive to replace them, the less Inclination have they to join again firmly; and by exciting Convulsions and a Gangrene, take off the Patient. Therefore whenever Luxations are attended with such grievous Accidents as are certainly desperate, if we would preserve the Life of the Patient, we must of Necessity speedily take the Member intirely off. If the Luxation is attended with a Fracture, then the Luxation must be reduced first, if possible,

and

and the Fracture is to be set afterwards. But when this cannot be done, it will be proper to have Recourse to what we have before observed on Fractures, *Book II. Chap. II. § XI.* If any Joint should become stiff and immoveable, it will be proper to treat it in the Manner mentioned near the Place now cited. Lastly, if the Luxation be inveterate, and the dislocated Bone, after the Use of Baths and emollient Fomentations cannot yet be reduced, it is much better to abstain from violent Extensions, and give it up, than to torture the Patient with excessive Pains which might probably excite the most grievous Symptoms.

C H A P. III.

Of LUXATIONS in particular ; and on those of the HEAD and NOSE.

I. **H**AVING treated of Luxations in general, it remains that we consider each particular Luxation by itself. We shall therefore begin first, with those of the Head, and then descend to the rest, as we did in expounding the Doctrine of Fractures. There are not wanting some who deem it a Luxation of the Head, when the Bones of the *Cranium* are separated any Distance from each other ; whether it proceeds from an *Hydrocephalus* in Infants, or from violent Head-achs, or ardent Fevers in Adults. But there is no room for us here to treat more largely on these Luxations. The Method of treating the first, we shall deliver when we come to consider the *Hydrocephalus*. But as the other very seldom, if ever, happens, it seems to be curable by no other Method than that of Bandage and Compression.

Dislocation
of the Head.

II. It sometimes, though not often, happens, that the Bones of the Nose are separated from each other, or distorted out of their natural Places by some violent Blow or Fall. When such an Accident happens, it is several Ways discoverable : As (1.) by the Sight, when we behold the deformed Position of the Nose. Or (2.) by Feeling. Or lastly, (3.) by the Ear, when we perceive with what Difficulty the Patient draws his Breath through his Nostrils. But as we before observed, these Luxations do but seldom happen : For the Bones of the Nose are so firmly connected to the *Os Frontis* and other Bones, that they will sooner break than separate from each other.

Luxation of
the Nose.

III. When this Case happens, the Patient is to be speedily placed in a high Chair, that an Assistant may stand behind and hold his Head firm, in a proper Posture. The Surgeon is then to introduce with one Hand, a thick Probe, a Goose-quill, (as in the Case of a Fracture, *Book I. Chap. III.*) or little Stick shaped for the Purpose, up the Nostril internally, by which means the depressed Parts of the Nose may be thrust into their Places. In the mean Time he applies his other Hand externally, to guide and direct the Parts which are moved from within. This being done, there is scarce any thing else required but to let a bit of sticking Plaster lie upon the Nose at the same Time. But if any thing should occasion a Wound in the Nose at the same Time, the Cure must be carried on in the Way which we proposed before under a Fracture of the Nose.

Cure of a
luxated
Nose.

IV. If

IV. If a Tooth be removed from its Place by a Fracture of the Jaw, or any other Accident, it may be properly termed a Luxation. But this, when replaced, from the Testimony of many Writers, generally settles again in its Socket, and adheres firmly to the Gums.

C H A P. IV.

Of a DISLOCATION of the LOWER JAW.

How the
Jaw may be
luxated.

I. **T**HE Lower Jaw is indeed seldom luxated, because it is held so firm by strong Ligaments and Muscles, by whose Assistance it is retained in two *Sinuses* in the Basis of the *Cranium*. But when it is by Accident forced out from thence, it may chance to be on one Side only, or else on both, it being then thrust directly forwards. And this happens most frequently from opening the Mouth too wide in yawning: Though it has sometimes been occasioned by a violent Blow or Fall. If it be luxated on both Sides, the Chin will incline downward, and the Jaw will be thrust very forward: But if only on one Side, the Chin will be inclined toward the opposite Side; the elapsed little Head of the Jaw not being capable of Dislocation but forward and inward^a; for the Processes of the Bones of the *Cranium* prevent the Jaw from being dislocated backwards. Hence it seems strange that any one should assert, contrary to the common Observations and Writings of the best Practitioners, that the Lower Jaw may be luxated backwards as well as forwards. This is so inconsistent, that though he should confirm his Opinion by Examples and Observations, it must be looked upon as the Consequence of some Difference in the Articulation from what is usual in Nature.

How to dis-
cover a Lux-
ation of the
Lower Jaw.

II. The Lower Jaw is chiefly known to be luxated on one Side, when the Chin is distorted on the opposite Side. For that Part to which the Chin inclines, is the sound: But that from whence it recedes, is the luxated one. The Mouth in this Case gapes wider than usual, so that the Patient cannot shut it, nor eat with his Teeth; the lower Range of Teeth being projected beyond, and on one Side the Upper. But when the Jaw is luxated on both Sides, then the Mouth not only gapes wide and open, but the Chin also hangs down, and is thrown directly forwards: So that it is no wonder if the Patient cannot shut his Mouth, speak distinctly, or even swallow any thing without much Difficulty.

Prognosis.

III. When the Jaw is out only on one Side, and the Case recent, the Cure is usually not so very difficult, But when both Heads are dislocated, and not presently restored to their Places, it always occasions the worst of Symptoms, as Pains, Inflammations, Convulsions, Fevers, Vomitings, and at length, as HIPPOCRATES observes, Death itself comes on. And these Symptoms are the more violent, as the adjacent Nerves, Tendons, and Ligaments suffer a greater Extension. But if an expert Surgeon comes in Time, the Luxation is not very difficult to reduce.

Cure.

IV. When this Kind of Luxation happens, the Patient is to be directly seated on a low Stool, so that an Assistant may hold his Head firm back against his Breast. Then the Surgeon is to thrust his two Thumbs as far back into the Patient's Mouth as he well can: But they are to be first wrapped round in a Handker-

^a See MONRO's learned Dissertation on this Subject. *Act. Edinb.* Vol. I. Art. II.

chief,

chief, to prevent them from slipping or being hurt ; and his other Fingers are to be applied to the Jaw externally. When he has got firm hold of the Jaw, it is to be strongly pressed, first downwards, then backwards, and lastly upwards, but so as that they may be all done in one Instant : By which means the elaps'd Heads of the Jaw may be very easily shov'd into their former Cavities. But the Surgeon ought to be always careful to snatch his Thumbs quickly out of the Patient's Mouth, lest they should be compressed, bruised, or bit, by reducing the Jaw into its Place.

V. If the Jaw be out on one Side only, every thing must be done in the same Manner : But the luxated Side of the Jaw must be forced more strongly downward and backward than the sound one. Some say this Luxation may be sometimes very readily reduced by a violent Stroke on the opposite Side of the Jaw : But this is a Method too pleasant to be used with Safety in most Patients. As for Bandages there seems to be no great Occasion for them in this Case, unless the Luxation has remained some time before it was reduced ; for then it may not be improper to apply for several Days the four-headed Bandage, with some strengthening Spirit, which may be taken off when the Patient intends to eat.

Of the Jaw
luxated on
one Side.

CHAP. V.

Of LUXATIONS of the HEAD and SPINE.

I. **T**HE Luxations which happen in the *Spine* and *Vertebræ* of the Back are generally imperfect Ones. For it appears from an accurate Consideration of the Structure and Articulation of these Bones, that none of the *Vertebræ* can be entirely displaced without being fractured, and also compressing or wounding the Spinal Marrow, which must produce Danger of instant Death. Even the imperfect Luxations of these Bones are very dangerous : Which happen either between the two superior *Vertebræ* of the Neck and the Head, or elie between the rest of the *Vertebræ*, when they are forced from each other.

How the
Vertebræ
may be lux-
ated.

II. Such as have a Luxation between the Head and upper *Vertebra*, seldom escape being carried off by a speedy and sudden Death. For in this Case the tender *Medulla* which joins immediately with the Brain, and is lodged in the Spine, the Brain itself, and the Nerves which arise beneath the *Occiput*, are too much distended, compressed, or lacerated. The two condyloide Processes of the *Occiput* usually slip out of their glenoid Sinus's in the first *Vertebra* of the Neck, when a Person falls headlong from a high Place, from off a Ladder, from on Horseback, or when he receives a violent Blow upon his Neck. They dying very suddenly in this Case, are vulgarly said to have *broke their Neck*, tho' there is generally no more than a Luxation : Yet it sometimes happens that the *Vertebræ* of the Neck are really fractured. If Life should remain after such a Luxation, which very rarely happens, the Patient's Head is commonly distorted with his Chin close down to his Breast, so that he can neither swallow any thing, nor speak, nor even move any Part that is below his Neck. Therefore, if speedy Assistance be not had, Death ensues, from the Compressure or Hurt of the *Medulla*.

Luxation of
the Head.

How the
Head is to be
placed.

III. But to repulse this unwelcome Messenger, the Patient is to be immediately laid flat upon the Ground or Floor. Then the Surgeon kneeling down with his Knees against the Patient's Shoulders, is to bring them together so as to contain the Patient's Neck between them: This done, he quickly lays hold of the Patient's Head with both his Hands, and strongly pulling or extending it, he gently moves it from one Side to the other; till he finds, by a Noise, the natural Posture of the Neck, and the Remission of the Symptoms, that the Dislocation is properly reduced. By this Method the Surgeon retains the Patient firm between his Knees, and performs the Extension and Reduction with his Hands.

Another
Method of
Reduction.

IV. The same may be effected by another Method much like the former: As when the Patient sits upon the Ground, his Shoulders being pressed down, and his Head laid hold of under the Ears, and pulled strongly, but cautiously upwards, inclining it a little to each Side, till the Signs enumerated before (at § III.) demonstrate it to be restored to its natural Place. If any of the other *Vertebrae* of the Neck should be dislocated, the Reduction is to be made in the same manner: Therefore there is no occasion to give them here a separate Treatment.

PETIT'S
Method of
Reduction.

V. But M. PETIT (*Lib. de Morb. Off.*) rejecting the former Methods, has taught us another Way of restoring a Luxation of the Head, though he does not mention that he ever used it. He forms two Slings, having a large Opening about their Middle, as is delineated in *Tab. X. Fig. 1, 2.* The Patient lying on his Back, he takes the Sling, *Fig. 1.* and puts his Head through the Opening AB, which is made purposely large enough, and proportionable to the Size of the Head: The Part of the Sling A comes under the Patient's Chin, the Part B is placed under the *Occiput*, and the two Extremities of the Loop CC, come up over his Ears, the Ends D and E being the Parts by which the Extension is made. But to hold the Patient firm, he recommends another Sling, *Fig. 2.* through whose Opening F, the Head is transmitted so as to make the Part of the Sling G come down his Back, and the Part H to come over his Breast, the two Extremities of the Sling II, are to be joined together between the Thighs, and by this means the Body is to be held from giving Way to the Extension made by the other. While the Head and *Vertebrae* of the Neck are kept sufficiently extended by pulling these Slings in opposite Directions, the Surgeon endeavours to replace the luxated Bones. But, to say Truth, the preceding Methods seem to me to have the Preference: Partly because they are more simple and performed without any Assistants or other Instruments than the Hands, which former are not always to be had; and partly because the Patient may be relieved much sooner by these Means; for while the Machinery is fetching or adapting, the Patient will, in all Probability, be dead. PETIT lays down no other Method of reducing this Luxation, throughout his whole Book, than by his Slings, not even how to assist the Patient in such Cases: Whereas the Accident may happen very often in the Country, where such Slings and Assistants cannot be had to help the Patient. In the mean time, a Napkin, or long Slip of Linen of two or three Hands breadth, slit to let the Patient's Head through, will make a good Substitute for these Slings when they are not at hand.

What is to
be further
done.

VI. But after any of the *Vertebrae* are replaced by any Method, it will be proper, in order to prevent a Tumor, and restore the stretched Ligaments of the

the Neck to their former Vigour, to bathe it with *Aq. Hungar. Sp. Vin. Camph.* or some other strengthening Spirit applied warm, as also Compresses dipped in the same: The Patient should bleed, and rest gently for some Days, till the Neck be found sufficiently strong and well. As for Bandages, there seems to be little occasion for them here, unless it be such as are designed to keep on the Compresses, dipped in some strengthening Spirit.

VII. With respect to the rest of the *Vertebrae* of the Back, they are seldom moved quite out of their Places, unless they are fractured, they being retained for the greatest Part, by adhering to the adjacent Ligaments and Muscles. Therefore the Luxations which happen among them are usually imperfect; no more being displaced than their two upper or lower Processes, and they often but on one Side. And this happens sometimes to one of the Spinal *Vertebrae*, and sometimes to more. But it is here to be briefly observed, that it is usual to include among the Number of luxated *Vertebrae*, that which is sound and firm, but intercepted by others which are not so. Thus whenever the upper *Vertebra* of the Loins from the last of the Back, and lowermost *Vertebra* of the Loins next the *Os Sacrum* are luxated, we commonly say and reckon there are five *Vertebrae* out of their Places: When strictly speaking, only the two outermost or the uppermost and lowermost of those *Vertebrae* are disturbed; the three middle Ones retaining their natural Situation and Connection.

Of Luxations in the other *Vertebrae* of the Back.

VIII. If any one closely considers the natural Structure and Connection of these Bones, it will pretty evidently appear, that the Spinal *Vertebrae* are not to be luxated but by some very considerable Violence. For, besides their being most closely joined to each other by means of *Processes* or *Apophyses*, they are tied together and connected very firmly by exceeding strong Ligaments and Cartilages. And this is the Reason why the Spinal *Vertebrae* are not luxated, unless those Cartilages and Ligaments should break, in violently bending the Back, or receiving some great Blow or Fall thereon: For these Accidents are generally so far from separating them, that they drive them more closely together. But if this should happen from some very great Violence, it shatters the Spinal *Vertebrae* and their *Medulla*, and quickly kills the Patient, as I myself have sometimes seen. Therefore whenever a *Vertebra* is luxated without being fractured, the Body must, of Necessity, incline strongly forwards, or on one Side. For in this Case, the superior Processes of the *Vertebrae*, by which they are fastened to each other, will be separated from the inferior Processes, by which means the *Vertebrae* will be disposed to be easily removed from each other: And they will incline towards the right Side, when the Hurt is on the Left, and the contrary.

How Luxations of the Spinal *Vertebrae* can happen.

IX. The Signs common to Luxations in the *Spina Dorsi* are chiefly the following: The Back itself is found to be crooked or unequal, after the external Violence has been inflicted: The Patient can neither stand nor walk, and his whole Body seems to be paralytic. The Parts which are beneath the luxated *Vertebra* are nearly without all Sense and Motion: The Excrements and Urine cannot be discharged, or else they are sometimes emitted involuntarily; the lower Extremities grow dead by Degrees; and, at length, Death itself follows. But these Symptoms vary in Proportion to the Degree of Violence in the Luxation: For the more Disorder the *Spina Dorsi* undergoes, the more grievous and dangerous will be the consequent Symptoms.

The common Signs of Luxations in the *Vertebrae*.

The parti-
cular or pro-
per Signs.

X. But what Number of the Spinal *Vertebrae* are luxated, must be judged of by the Degree of that preternatural Incurvation^a. For where there is but one *Vertebra* luxated, the Curvature is gibbous, making a Sort of Angle. If the Processes of the *Vertebrae* are displaced forwards, then the *Spina Dorsi* will seem to bend inwards; and the Patient will always have violent Pains upon bending his Body: On the contrary, when he lies upon his Back, the Pains will be more gentle. If the *Vertebra* is luxated on the right Side, the Body may be observed to incline towards the Left, and it will be easier bent on the right than left Side: If the *Vertebra* be luxated on the left Side, the contrary of all these Appearances usually follow.

Prognosis.

XI. If any one be desirous to presage the dubious Events of Luxation in the *Vertebrae*, I would have him remember that these Cases are generally very dangerous and uncertain: And that, even when the *Medulla* is neither contused nor wounded, but from the Difficulty of reducing the luxated *Vertebrae*: And the more the *Vertebrae* are displaced, the more will the *Medulla* be injured, the worse will be the Symptoms that arise, and the more precipitate will be the Patient's End. The nearer the luxated *Vertebra* is to the Head, the greater and more extensive is the consequent Danger. For as Injuries are the easiest to be inflicted upon the *Medulla* in those Parts, so they are always of the worst Consequence. Therefore Luxations in the Neck are always more pernicious than those which happen in the Back; and those in the Back are much worse than those which happen in the Loins. And what may seem wonderful is, that the Symptoms appear much milder in Cases where several *Vertebrae* are luxated, than they do when there is only one; and still much milder, when the Processes on both Sides are displaced, than when only one of them are luxated. For in the latter of these Cases, the *Medulla* is more compressed upon a less Space, as will appear evident to such as carefully consider the Structure of the *Spina Dorsi*. But then in slight Luxations the *Vertebrae* may be more easily replaced, and therefore Men may be often in less Danger of Death on that Account.

Cure.

XII. To make the Case no better than it is, Luxations of the Spinal *Vertebrae* are, in general, very difficult to reduce. The Artifices used by the Ancients were so foreign and unadequate to the Case, that they seem to have been used to no Purpose, proving rather a Torture than a Remedy. The following seems to be the most suitable Method of reducing Luxations of the *Vertebrae*: When the *Apophyses* of the *Vertebrae* are dislocated on both Sides, the Patient is to be laid leaning upon his Belly over a Cask, Drum, or some other gibbous Body. Then two Assistants are strongly to press down both the Ends of the luxated Spine, on each Side: By which means the Bone of the Spine will be set free from each other, lifted or pushed up in the Form of an Arch, and so gradually extended. This done, the Surgeon presses down the luxated *Vertebrae*, and at the same time nimbly pushes the superior Part of the Body upwards: And by this Means the luxated *Vertebrae* are sometimes commodiously reduced into their right Places. But if Success should not attend the first Time, the Method should be repeated two or three Times more.

XIII. PETIT lays a thick Cloth rolled up like a Cylinder across upon the Bed, and placing the Patient over it, treats him in the same Method which we just now proposed. When the *Vertebra* comes out on one Side, the Patient is then

^a See SAVIARD's *Obs.* of Luxations of the *Vertebrae Dorsi* &c.

to be placed inclining in the prone Posture now mentioned; but so that, when the left *Apophysis* is displaced, one Assistant may press the lower *Vertebrae* inwards to the Right, and another Assistant may depress the right *Humerus*, & vice versa. For if there be any convenient Method of reducing the Spinal *Vertebrae* when luxated, there can scarce be any more commodious than that here proposed. And from hence I see it will appear evident, that the generality of those Slings, Bandages, Pullies, Leavers, and other Instruments, which the antient Surgeons used to fasten about the Patient's Hips, Shoulders, and Breast, and are to be seen figured and described in ORIBASIUS, PAREY, and SCULTETUS, must be on every hand allowed to be so far from suitable for reducing these Luxations, that they must be generally pernicious.

XIV. For the Remainder, it seems proper, after the *Vertebrae* are reduced, to bathe the Spine with *Sp. Vin.* or to lay on Compresses dipped in *Sp. Vin. Campb.* and to bind the Parts up with the *Napkin-and-Scapulary*. Afterwards the Patient is to be laid in a soft and even Bed: Bleeding, and bathing the weak Parts with strengthening Spirits, are to be used as there may be Occasion. The Bandage must be very seldom taken off, and all the Symptoms which happen in these Luxations are to be palliated as usual, till the Cure is perfected.

CHAP. VI.

Of LUXATIONS of the Os Coccyx, Ribs, and Clavicles.

I. **T**HE *Os Coccyx* may be thrust inwards by a violent Fall or Blow, and it is often pushed outwards in hard Birth. When this happens, it is usually attended by violent Pain and Inflammation about the lower Part of the Spine, Abscesses form in the *Intestinum Rectum*, and the *Faeces* are constipated or suppressed. To discover the Luxation of this Bone the more readily, we have Recourse to the Use of our Hands and Eyes, as well as to the Knowledge of the forementioned Symptoms. Nor is the replacing this Bone very difficult, if attempted by a careful and expert Surgeon^a. For if it be thrust outwards, it must be depressed into its right Place by the Thumb: After which may be applied Compresses dipped in warm Wine, or its Spirit, made broad above, and narrow below, to fill up the posterior *Sinus* of the *Nates*: And these may be held on by the T Bandage of HELIODORUS, *Tab. II. Fig. h.* But that Part of this Bandage which comes between the Thighs, should be slit and placed so that the Patient may go to Stool without undoing the Bandage, and to prevent the Bone from being by that Means displaced again.

A Luxation of the Os Coccyx outwards.

II. When the *Os Coccyx* happens to be luxated inwards, the first Finger is to be introduced into the *Anus*: After it has had its Nail cut and been dipped in Oil, it must be thrust as far as possible, that it may the more readily drive out the depressed Bone: The other Fingers being applied externally, are to conduct the Bone into its right Posture. When this has been done, it will be proper for the Patient to rest some time upon the Bed; and when he sits up, it should be in a

Luxation of the Os Coccyx inward.

^a PETIT acquaints us, that, from neglecting the Assistance of a Surgeon in this Case, an Abscess ensued, a Caries, a slow Fever, and which terminated in Death.

See his Treatise on Diseases of the Bones, T. I. C. 5.

Chair with a Hole in its Bottom, lest the affected Part should be otherwise compressed or disturbed.

Luxations of
the Ribs.

III. The Ribs are indeed sometimes, tho' but seldom, dislocated. For upon the Assault of some external Violence, it is not uncommon for them to be displaced either upwards, downwards, inwards, or outwards. They cannot be easily luxated outwards, because prevented by the Vertebral Processes, and resisted by very thick and strong Muscles. But when they are drove into the Cavity of the *Thorax*, they not only lacerate the *Pleura*, or Membrane, which lines the Cavity of the *Thorax*; but do generally great Injury to the contained Parts. In consequence whereof arise most sharp Pains, Inflammations, Difficulty of Breathing, Cough, Ulcers, Immobility, and many other dangerous Symptoms of the like Nature. But by what Signs such Dislocations of the Ribs are to be discovered, there is no occasion to consider here at large: Since the external Form and Posture of the Side, with the troublesome Symptoms now enumerated, generally afford evident Demonstration whether any of the Ribs are luxated, and on which Side.

How the
Ribs are to
be reduced,
when lux-
ated upward
or down-
ward.

IV. The more numerous and grievous the consequent Symptoms are, the greater is the Danger, and the more speedily should the Luxation be reduced. When the Rib is dislocated either upwards or downwards, in order to replace it conveniently, the Patient is to be laid on his Belly upon a Table, and the Surgeon must strive to reduce the luxated Rib into its right Place with his Hands: Or, the Arm of the disordered Side may be suspended over a Gate or Ladder, as is shewn by Figures in PAREY and SCULTETUS, and while the Ribs are thus stretched up from each other, the Heads of such as are luxated may be pushed into their former Seat.

How the
Ribs are to
be reduced,
when lux-
ated inter-
nally.

V. But those Luxations, wherein the Heads of the Ribs are forced into the *Thorax*, are generally found to be much the most difficult to reduce; since neither the Hand, nor any other Instrument, can be applied internally to direct the luxated Heads of the Ribs. But notwithstanding there are many eminent Surgeons who pronounce this Case to be wholly incurable; yet, in my Opinion, we ought not to despair of being frequently successful. In this Case it seems proper to lay the Patient on his Belly over some gibbous or cylindric Body, and to move the Fore-part of the Rib inwards towards the Back, shaking it sometimes: For thus generally the Head of the luxated Rib slips into its former Place. But if this Method of Cure will avail nothing, and the deplorable Condition of the Patient requires speedy Help, we have no Remedy left but Incision, and endeavouring to replace the luxated Head of the Rib with the Fingers, Pliers, or little Hooks, after the same Manner which we proposed before in Fractures of the Ribs, *Book I. Chap. X. § VIII, & seq.* In the mean time, where the Symptoms are not very urgent, and the Heads of the Ribs but little displaced, it is adviseable neither to cut the Flesh, nor violently force the Ribs: Because there are several Instances where the luxated Ribs have retained their dislocated Stations without any Hurt. But above all, Care must be taken to lay on a Compress dipped in warm *Sp. Vin.* or *Sp. Vin. Camph.* to be retained on the afflicted Part of the Side by the *Napkin-and-Scapulary*.

Luxations of
the Clavi-
cles.

VI. Tho' the Clavicles are sometimes displaced, it is but seldom, by reason of their strong Ligaments. They may be dislocated either from the Top of the *Sternum*

Sternum or *Processus Acromion* of the *Scapula*, to which they are connected, by some external Violence, as a Fall, Blow, the lifting some great Weight, or the like. With regard to the Cure, the sooner Assistance is had to the Patient, the more easily may the Reduction of the Clavicle be performed: But when the first is delayed, the latter will be more difficult, inasmuch that inveterate Luxations of the Clavicles are generally found incurable.

VII. The Clavicles may be dislocated in two Manners from the *Sternum*, ^{(1.) near the Sternum.} either internally towards the *Larynx*, or externally upon the Breast. When the first Case happens, a Cavity may be generally observed upon the Part affected, and the *Trachea* with the Carotid Arteries, the jugular Vein, Nerves, and *Oesophagus*, which are all together, will be very much disturbed and compressed. On the contrary, when it is luxated forwards upon the Breast, it shews itself by a preternatural Tumor instead of a Cavity, upon that Part.

VIII. In what manner the luxated Clavicles may and ought to be extended and reduced again into their natural Places, has no Business to be inserted again in this Place: Because every thing is to be observed the same as we proposed in reducing Fractures of the Clavicles, *Book II. Chap. V. N. 4.* But this must be particularly regarded, to carefully remove the Injuries of the Neck, as soon as the Bones are replaced. If any Kind of Luxation requires an accurate Retention by Bandage, it must certainly be this of the Clavicle: especially when the Luxation has happened some time before its Reduction. For, besides, that the Clavicles have scarce any Muscles to support them, their Ligaments are generally so much stretched and weakened in this Case, that they are in no wise sufficient to sustain the Weight of the Arms. It will therefore be proper to apply such a Bandage to the Neck, as we shall describe at large in the Doctrine of Bandages.

How the Clavicles are to be replaced.

IX. Such Luxations of the Clavicles as happen near the *Processus Acromion*, ^{(2.) near the Acromion.} are generally much the more difficult to discover; so obscure, that as HIPPOCRATES (*Lib. de Articulis, N. 62.*) and PAREY witness, Abundance of the best Physicians, and Surgeons not a few, have been deceived in the *Diagnosis* hereof, taking it to be a Luxation of the *Humerus*, and so have miserably tortured the Patient to no Purpose. Whenever this Luxation happens, as PAREY observes, the superior Part of the *Scapula* sticks up; but in the Place where the Clavicles are separated from the *Acromion* Process, a Cavity may be observed. Most acute Pains arise, and the Arm itself cannot be moved or lifted up. If therefore the luxated Clavicles are not timely reduced, it is no wonder that we meet with some People, who, from neglecting the Case, entirely lose the use of their Arms afterwards, so as that they cannot lift them up to their Head or Mouth. GALEN himself says, (*in Comment. in HIPPOCRAT. Lib. I. de Articulis, N. 62.*) “ I myself had once, in struggling, my Clavicle so vastly separated from the *Acromion*, that there appeared a *Sinus* between the Bones, of near three “ Fingers Breath.” In the mean time, a strict Bandage, continued about the Parts for forty Days to make the disunited Bones again coalesce, will be found very serviceable.

CHAP. VII.

Of a LUXATION of the HUMERUS

How the
Humerus
may be dis-
located.

I. **T**HE *Humerus*, from the Length and Laxity of its Ligaments, the Largeness of its Motion, and the Shallowness of the Cavity in the *Scapula*, into which it is articulated, is thereby rendered of all Bones the most subject and easy to be luxated. The Head of this Bone may often be dislocated under the Arm-pit, sometimes forwards, sometimes backwards, and even below the *Scapula*; but seldom perpendicularly downwards, and never directly upwards, unless the *Acromion* and *Coracoide* Processes of the *Scapula* should chance to be fractured at the same Time. Besides, as long as the strong *deltoide* and *bicipital* Muscles of the *Humerus* remain intire, they greatly resist and keep down the *Humerus* from being luxated upwards.

Signs of a
luxated
Humerus.

II. When the *Humerus* is luxated downwards (1.) there suddenly appears a Cavity, and upon pressing with the Fingers, you will perceive a *Sinus*; but under the Arm there must be a Tumor, because the Head of the Bone is thrust there. (2.) The *Processus Acromion* will seem to stick out further than usual, because of the adjacent *Sinus*. (3.) The luxated Arm will be longer than the other, and it cannot be lifted up towards the Head without violent Pain, and sometimes it cannot be lifted up at all, or even extended. But when the *Humerus* is luxated forwards as well as downwards, there will be observed the same *Sinus* under the *Processus Acromion* as before, and a Tumor will appear from the Head of the *Humerus* projecting towards the Breast, under the *Axilla*: The Arm itself also cannot be moved without exciting the most acute Pain. Lastly, when the *Humerus* is luxated backwards, the *Cubitus* is thrown forwards towards the *Præcordia*, and the Head of the Bone makes a Protuberance in the Shoulder: The Arm itself cannot be bent nor extended, nor even pulled outwards from the Breast, without occasioning the most violent Pains. But no Luxation of this Limb is attended with such dangerous Symptoms, as when it is dislocated forwards or inwards: Because the luxated Head of the *Humerus* cannot avoid injuring the large Arteries and Nerves of the Arm; in consequence of which, various Symptoms will arise.

Prognosis.

III. If Assistance be had to these Luxations soon after they have been inflicted, before the bad Symptoms come on, the Reduction of them into their natural Places again may be effected without much Difficulty: More especially, if the Bone be luxated directly downward or backward, it may be very easily reduced; but very difficultly when luxated inward, under the pectoral Muscle. So it may be easily replaced, when the Arm retains its natural Length: But if it be shorter, and the Accident has been done some Time, or accompanied with Tumor, Inflammation, or a Fracture of the *Processus Acromion*, it is then a very difficult Matter to restore the Limb to its former Strength and Motion. But when the Head of the *Humerus* grows fast to some of the adjacent Parts under the Arm, it can seldom be restored by any means whatever. The Reduction is also more difficult in People that are strong, or fat, than in such as are lean, or weak.

IV. As

IV. As soon therefore as the Luxation is discovered in the *Humerus*, the safest Way will be to seat the Patient on the Floor, or on a low Stool, as at *Tab. X. Fig. 3. A.* Two strong Assistants are to be placed on each Side the Patient, one of which B, should secure his Body, and, if possible, the *Scapula* too^a, that it may not give way to the Extension: while the other C, lays firm hold of the luxated Arm with both his Hands, a little above the *Cubitus*, gradually and strongly extending it. But before that Extension be made, the Surgeon himself D, should have a large Napkin, of a sufficient Length, tied at the Ends, and hung about his Neck so that the Knot may be behind; but the other Part of the Napkin E, must hang over his Breast. Then the Patient's Arm must be put through the Napkin up to the Shoulder, and the Surgeon at the same time lays hold of the Head of the *Humerus* with both his Hands. This done, he orders the Assistant to sufficiently extend the Limb, and in the mean time he elevates himself the Head of the Patient's *Humerus* by the Napkin about his Neck, directing it with his Hands, till it slip into its former Cavity in the *Scapula*. But I would advise the Surgeon to move the Head of the *Humerus* one way and the other, according to the Manner in which it is luxated; which must be left entirely to his Discretion. And by this means I have happily reduced a great many recent, though not inveterate Luxations of this Joint, particularly three in one Month, and that by no other Assistance or Machinery.

V. Though the Method now described for reducing this Luxation seems to be the most safe, ready, and commodious of any hitherto invented for that Purpose; yet it is found, that the Extension cannot, by this Means, be made sufficiently strong in some Cases; and this particularly when the Patient is very robust, or when the Case has been delayed some Time, without any Assistance. Therefore when one or two Assistants are not able to retain the Patient, and sufficiently extend his Arm, it is much the best way to use a long Napkin with more Hands; or to apply the Girt of HILDANUS (*Tab. VIII. Fig. 17.*) about the *Humerus*, a little above the *Cubitus*, and to make the Extension by a Rope put through the two Hooks, and by another Rope fastened to the middle of that, letting as many Assistants pull as may be sufficient, according to the Circumstances of the Case. But when the Extension is made with a great Force, it requires to be antagonised by a still greater Force, to keep the Patient steady. Therefore it is proper to retain the Patient by two Assistants; and if they are not sufficient, to use a long Napkin or Piece of strong Linen, slit and made in form of the Slings at *Tab. X. Fig. 1, 2.* that the luxated *Humerus* may be put through the Slit up to the *Scapula*. The one half of this Linen Sling should come over the Breast, the other half behind the Back, and both to meet afterwards together in a Knot: This is to be fastened upon a Hook, or given into the Hands of several Assistants, or else it may be fastened to a Beam, or some other fixed Point, so as to keep the Patient from being moved out of his Place. While this is performing, the Surgeon's immediate Business is, to accurately lift up, agitate, and restore the luxated Bone to its right Place, as we before directed. But when this Method also alone is insufficient to extend the *Humerus*, it will be proper to apply to it the Pulley, *Tab. VIII. Fig. 15.* and keeping the Patient firm, to make a prudent

How a Luxation of the *Humerus* is to be reduced.

The bare Hands are sometimes insufficient for the Extension.

^a A particular Stay might be contrived, for retaining the *Scapula*, by a long Napkin perforated in the Middle.

Extension of the *Humerus*, much as we proposed before in a Fracture of the Thigh, *Book II. Chap. VIII. N. III.*

The *Ambe*
of HIPPO-
CRATES.

VI. In these Kinds of Luxations, when the Hands were insufficient for Extension, the Antients, and particularly HIPPOCRATES, made use of a Machine which they called (*ἀμβή*) *Ambe*, which may be seen delineated in *Tab. X. Fig. 4* and *5*. It consists of a Pillar, or *Fulcrum AA*, and the moveable Lever *BC*, which is placed under and bound to the *Humerus* in the Manner of *Fig. 5*. by the Ligatures *EEE*. When this is done, the End of the Lever *B* is carefully and gradually pressed downward; by which means the other End of the Lever *C*, is moved upward, and thus the luxated Arm is both extended, and its Head replaced at the same time. This was frequently used with so much Success by them, that the Machine got a great Name, and is to this Day called the *Ambe* of HIPPOCRATES^a. Notwithstanding it was very successful, and may be still in such Cases, where the Head of the *Humerus* was luxated directly downward; yet, when the Head of the *Humerus* is luxated on one Side, or beneath the Neck of the *Scapula*, as generally happens, the Instrument elevating only directly upwards could not reduce the Luxation, but contused or lacerated the adjacent Parts, or else threw up and pressed against the Neck of the *Scapula*, often exciting violent Pains, in such Manner that (to say nothing now of its other Defects) it has been generally neglected by most for this long while, and is now wholly rejected.

Of other
Artifices for
this Purpose.

VII. To proceed, we must not omit taking notice here, that there are several other Methods and Contrivances invented, not only by the Antients, but also many of the modern Physicians and Surgeons, for reducing a Luxation of the *Humerus*. Those of the Antients are delineated by ORIBASIUS (*Lib. de Machinamentis*), PAREY (in his *Surgery, Book XV.*) GERSDORFF, BRUNSWIG, SCULTETUS (in their *Chirurgical Writings*) and other eminent Surgeons. As for the modern Contrivances, two of their Machines are published in the *Acta Eruditor. Ann. 1683, pag. 37.* another in JUNGKENII *Chirurgica Germanica, pag. 168.* where he treats of Luxations; another in PURMANNI *Chirurg. Curios. Tab. XIV. pag. 692*; and still another in PETIT's *Treatise on Diseases of the Bones*. And though these latter seem to be each in great Esteem with their own Authors, every one thinking he had mended the Defects of his Predecessors; yet there are some of the *French Surgeons* who esteem and publicly declare them to be either unnecessary, or less suitable than the *Ambe* of HIPPOCRATES^b. There are even some who look upon all Machines as unnecessary in this Case, but the Hands, and Napkins, or Slings; as GOUVE, a *French Man* too, in his *Surgery*^c.

Of PE-
TIT's Ma-
chine.

VIII. But because PETIT is an ingenious Surgeon, and well versed in his Profession, I thought it would be worth while to exhibit here the Machine which he so vastly commends, and to give a short Description thereof. See *Plate X. Fig. 7*. But such as desire a more full Account, may consult the Author's Book of Instruments itself^d. PETIT made it his Business to contrive his Machine so as not only to make a sufficient Extension of the Limb, which

^a See a Book entitled, *Dissertation en forme de Lettre.*

^b See ditto.

^c DOUGLAS too is of Opinion, that Writers in Surgery have been highly blameable in recommending useless and ridiculous Machines in a Luxation of the *Humerus*. *Op. Chirurg. Syll. pag. 47.*

^d As PETIT's Figures are from Wooden Plates, and but very indifferent, I have endeavoured to represent them as clearly as possible, that they may be better understood.

others had invented Means to answer very well before, but also to make a counter Extension or Resistance at the same time, to retain the Patient, and particularly his *Scapula*, sufficiently firm from giving way to the Extension of the Limb made by the Instrument. With this View he made a sort of Buttreffs or Supporter (*P'Archoutant*) of Ticken, a Foot long, of sufficient Strength, and lined with Leather, as at *Tab. X. Fig. 7.* The Arm is to be first put through the Opening A, so as to make one End B come over the Breast, and the other End C to go cross the Back. Its two Holes, DD, let in the two Horns or Legs of the Machine, *Fig. 6. aa*, whose other End, B, is lodged upon the Ground. In this Machine there are several little Pullies *cc, cc*, as in the *Poissy-spaston* of *Tab. VIII. Fig. 16.* round which passes the Rope *ddd*: There is also a moveable Handle E, by which the Rope is wound up through the Pullies, and the luxated Arm by that means extended. But that the Arm may be the better extended, he uses a peculiar Sling AA, *Fig. 8.* made of soft and double Leather, fourteen Inches long: This he fastens strongly round the lower Part of the *Os Humeri*, a little above the Elbow; the Skin being first pulled upwards, it is to be kept firm upon the Limb by means of a Silk Cord, three Quarters of an Ell long, sewed in a particular Manner to the Leather of the Sling, and to be fastened by a Knot at the two Ends *bb*: To this Silk Cord is fastened another Sling *cde*, by two moveable Loops *ff*, to which is to be annexed the Rope *ddd*, which passes round the Pullies of the Machine. The Apparatus being all rightly fitted, he orders his Assistant to wind up the Rope by the Handle E, *Fig. 6*; the Rope becomes by that means stretched, and the Arm to which it is fastened is gradually extended. In the mean time the Surgeon directs the Head of the *Humerus* with his Hands, that it may again obtain its natural Place, which it very often does of its own accord, without the Direction of the Surgeon^a.

IX. But to give my Opinion impartially concerning the Use of Machines for reducing a Luxation of the *Humerus*, I must needs say, that the Surgeon's Hands and a Napkin, with strong and dextrous Assistants to make the Extension, and hold the Patient firm, will, of themselves, be generally sufficient for the Business: But if any one be willing to use other Methods, he may pitch upon those as the best, which sufficiently extend the Bones, and equally stretch the Muscles every way alike, that the Head of the *Humerus* may be aptly replaced. Upon this Principle we may readily judge whether the *Ambe* of HIPPOCRATES be sufficiently proper or no to be applied in this Case: Or the still more uncertain Method of pulling and extending the luxated Arm over a Gate, Ladder, or Beam, by a Couple of tall and strong Assistants, in such Manner as to lift the Patient off his Legs: Or when a lusty and strong Assistant sits down on the Floor, and presently laying hold of the Patient's Arm, suddenly raises himself up thereby: Or lastly, when the Patient is seated on the Ground; and by placing the Foot under the Head of the *Humerus*, it is violently pulled upward, or any other way extended: All which Methods are handled at large by PAREY, in his *Surgery*, Book XV. But here it must be cautiously observed over and over, that

Of other
Methods less
in use.

^a This Machine of PETIT, and his Treatment of a Luxation of the *Humerus*, is smartly censured in a *French Journal (des Sçavans)* M. March, 1734. (which the Author of the late quoted Dissertation has seconded) and many notorious Errors are there discovered.

the Nerves, Veins, Arteries, Muscles, and the Bones themselves, be not contused or broke, by the too great Strength and Suddenness of the Extension. That such Accidents as these may readily happen in a rough Extension of the luxated Arm over a Gate, &c. where the Patient is suspended by it, we shall find no room to doubt, especially if we consider the Reasons and Instances cited by PETIT (in his Chapter on a Luxation of the *Humerus*) and others. And since this is the Case, the Surgeon's principal Care and Business in the Extension will be, to let the Arm be stretched out with a Force strong enough, but equable, before he strives to replace the luxated Head of the Bone: Otherwise he acts to no Purpose, or to a very bad one, by bruising and lacerating the neighbouring Parts.

A new Machine.

X. There is still another new and very considerable Machine with a Pulley, which I received not long ago from a very eminent Surgeon, designed for the Reduction of an obstinate and inveterate Luxation of the *Humerus*; whose great Advantages he very much praised and recommended to me: But because I have not yet had Opportunity to use it, and so could not experience its Effects, I must refer the Description thereof to another Opportunity.

C H A P. VIII.

Of a LUXATION of the CUBITUS.

In what manner the Cubitus may be luxated.

I. **T**HE *Cubitus* consisting of two Bones, the *Ulna* and the *Radius*, is articulated by *Ginglymus*, which the *French* call *Charniere*, as is evident from what is said of these Bones in the Writings of Anatomists. The Connection of these Bones is such, that the *Ulna* or *Cubitus*, as being the largest Bone, and seated in the inferior Part of the Arm, does, of itself, perform the whole Flexion and Extension of the Arm, yet it cannot perform that Motion without carrying the *Radius* along with it: So that the *Radius* always follows the *Ulna* in Flexion and Extension. But on the other hand, the *Radius* may be turned along with the Hand both inward and outward, without at all moving or bending the *Ulna*: As when the Pronation and Supination of the Hand is made thereby. Both these Bones of the *Cubitus* are so articulated with the lower Head of the *Os Humeri*, that large Protuberances are received into deep Cavities or Grooves, and the whole invested and fastened with exceeding strong Ligaments. So that notwithstanding the *Cubitus* may be luxated in all four Directions, outward, inward, forward, and backward, yet it is but seldom that it suffers a perfect or entire Dislocation. Unless the upper Part of the *Ulna*, called *Olecranon*, be broken, or the Ligaments of the *Cubitus* much weakened, by some very great external Violence.

How to discover a Luxation of the Cubitus.

II. If the *Cubitus* be luxated backward, which is the most frequent of all others, then the Arm becomes crooked and shorter, and it cannot be extended. In the inward Part of the Bend of the Arm, the Head of the *Humerus* may be observed to stick out; in the back Part of the same, the Head of the *Ulna* or *Olecranon* will be protuberant, and between both Bones will appear a *Sinus* or Cavity. But it very seldom happens that the *Cubitus* is luxated forward, from the Largeness of the *Olecranon*; unless that be fractured at the same time.

time. But if this should happen, the Head of the *Humerus* will stick out behind, and that of the *Cubitus* before; and there will be a Cavity more or less in Proportion to the Degree of the Luxation. When the *Cubitus* is luxated externally, the Protuberance appears on the Outside of the *Cubitus*; and the contrary when luxated inwards. To conclude, unless the Ligaments and Muscles of the *Cubitus* are quite broken in two, it is so far from being capable of suffering a perfect Dislocation, that no more can happen to it than a Subluxation, *i. e.* it can recede but a very little way out of its right Place. But whatever of this Kind happens, the Case may be very easily understood, by feeling and inspecting the Part, if there be no Tumor: But if the Joint be much swelled, it is very difficult to be discovered.

III. Since, in the more violent Kind of these Luxations of the *Cubitus*, the *Pregness.* Tendons and Ligaments must be very much strained; it is no wonder (if these be not speedily helped) that there should follow grievous Pains, Tumors, Inflammations, Convulsions, Vomiting, Fever, and at length Gangrene and Death: An ample Witness whereof is PAREY, in *Book XIV. Chap. 18.* and *Book XVIII. Chap. 33.* And to make no Dissimulation in the Case, when the *Cubitus* is dislocated, it is a very difficult Matter to replace it again, by reason of its Inequalities and strong Ligaments: And this more especially when the Luxation is very violent or inveterate; for the slighter and more recent the Luxation, the more easy will be the Reduction.

IV. Be the Luxation however more or less, the Patient must be speedily placed in a Chair, and both Parts of the Limb, the *Humerus* and the *Cubitus*, must be extended in opposite Directions, by two stout Assistants, till the Muscles are found pretty tight, with a free Space between the Bones. Then the luxated Bone must be replaced with the Surgeon's bare Hands, or together with Bandages: And that the Processes may fall into their *Sinuses*, the *Cubitus* must be afterwards suddenly bent. But if the Tendons and Ligaments are so violently strained, that they can scarce perform their Office; it will not be improper to anoint them well with emollient Oils, Ointments, or the Fat of Animals, or to apply emollient Fomentations and Cataplasms. Where the bare Hands are not sufficient to make a proper Extension upon the Limb in this Case, it will be very proper to use the Means and Instruments which we before proposed in *Book II. Chap. VIII. N. 3 and 4.*

V. As soon as the Reduction has been by these Means effected, the Articulation must be bound up with a proper Bandage, and the Arm is to be afterwards suspended in a Napkin or Sling about the Neck. But Care must be taken, as HIPPOCRATES himself advises, that the Bandage be not suffered to be on too long, nor the Arm to be kept all the Time still, without some gentle Motion. For thus there would be Danger of the Mucilage of the Joint becoming inspissated, whereby the Articulation might become stiff, and quite lose its Motion. But happily to prevent this, it is very necessary to undoe the Bandage every, or every other Day, and to gently bend and extend the Limb: Afterwards, Compresses dipped in burnt Wine, may be applied hot, and held on firm with a Bandage, till the Swelling and Inflammation, if there be any, subside, and the Ligaments and Articulation regain their former Strength.

How a Luxation of the *Cubitus* is to be replaced.

How the *Cubitus* is to be treated after Reduction.

C H A P. IX.

On LUXATIONS of the HAND, CARPUS, METACARPUS, and FINGERS.

Luxation of
the Hand.

I. **N**otwithstanding the Hand is very accurately connected to the two preceding Bones, and particularly to the *Radius*, by means of the *Carpus* and strong Ligaments, yet it sometimes suffers Luxation in all four Directions. But it is generally not so easy to be luxated on either Side, as forward or backward, because of the two Processes of the *Radius* and *Ulna*, which guard it on each Side. The Hand is said to be *luxated forwards* or *inwards*, when it recedes from the Muscles which bend the Fingers; to be *luxated backward*, when it departs from the Muscles which extend the Fingers. Much also in the same manner, the Hand is judged to be *luxated outward*, when the *Carpus* makes a Tumor near the Thumb, and a Cavity near the little Finger: To be *luxated inward*, when the contrary happens. This being rightly considered, it will not appear difficult to distinguish the Signs by which we are to discover a Luxation of the Hand.

Symptoms
and Prog-
nosis.

II. For, if a Luxation of this Kind should happen, it can hardly avoid being accompanied with violent Pains, on account of the Ligaments (though strong) being too vehemently strained: The Fingers also cannot be bent nor extended, from the violent Compression of their Tendons. Upon which account, it is no wonder if there follows grievous Inflammation, Tumor, Abscess, Stiffness of the Joint, Gangrene and *Sphacelus*, or *Caries* of the spongy Bones in the *Carpus*; which evils are seldom remedied but by amputating the Limb. But when the Luxation is but slight and recent, the Cure may be effected with much more Ease, and the Dislocation will not be attended with such grievous Symptoms.

How a Lux-
ation of the
Hand is to
be reduced.

III. It therefore seems to be the safest Way immediately to reduce what is displaced. And that this may succeed the better, two Things are to be chiefly regarded: (1.) That the luxated Hand be sufficiently extended by two Assistants, one of which is to lay hold of the Hand, and the other of the *Humerus*, pulling in opposite Directions: (2.) That the Part of the extended Hand, where the *Sinus* is, be placed on a Table, or some other flat Body, that whatever sticks up may be depressed. By which Method the Hand, in whatever Part luxated, may be very readily reduced into its natural Seat.

Luxation of
the Carpal
Bones.

IV. It also sometimes happens, that one or two of the eight little Bones of the *Carpus* are luxated and distorted from their natural Seat by some external Violence. When this happens, there will be perceived a Tumor in one Part, and a Cavity in another, which may be also felt by the Fingers; besides, violent Pains will be felt by the Patient. For the rest, as this kind of Luxation is very easily discovered, partly by the Sight, and partly also by Feeling; so, when it is recent, it is almost as readily cured, letting the Hand be extended in the Manner we before proposed (at N. III.) and the dislocated Bone be afterwards forced into its Place.

Luxation of
the Meta-
carpus.

V. The four small Bones, which are found in the *Metacarpus*, or Palm of the Hand, may be sometimes luxated from the *Carpus* itself, to which their upper Parts are connected: Which usually happens from some external Violence; notwithstanding they have a natural Inclination to resist such Luxation. For the

two Bones which are seated in the Middle between the two other external Ones, cannot be dislocated to either Side: As the two external Ones which sustain the first and little Fingers cannot be luxated inwardly, but are more easily driven outward: Tho' each of them may be luxated on the fore or back Part of the Hand. But which ever of these happens, the particular Disorder may be discovered and examined by feeling and inspecting, and the Cure may be carried on in altogether the same Method which we directed before at § IV.

VI. Lastly, the Bones of the Fingers, to which we join those of the Thumbs, are liable to Luxation at each of their Articulations, and that in several Directions. But these Accidents, if recent, are both very easy to discover and cure. For the Ligaments being not very robust, the Fat and Muscles thin, and the Sinuses of the Articulations shallow, render the Extension very easy, and the Reduction of them into their former Places may be done very readily. While one Hand of the Surgeon extends the Finger, he strives with his other to replace the Bones in their natural Seat. The Bandage proper to dress the Finger after Reduction will be explained more at large in the third Part of this Book, where we treat professedly on Bandages.

Luxation of the Fingers.

CHAP. X.

Of a LUXATION of the THIGH.

I. **V**ERY rare is it that the Head of the thigh Bone is displaced out of its *Acetabulum*; tho' formerly it was supposed to be pretty frequent, the Physicians taking a Fracture thereof for a Luxation, as we have observed in treating on Fractures. See *Book II. Chap. VIII. § VI.* and *Book III. Chap. I. § IX.* The Reason whereof may be taken from the Articulation itself. (1.) How very deep is the *Sinus*, called by the Antients *Sinus Coxæ*, and by the Moderns *Acetabulum*, into which the Head of the Thigh-Bone is received. (2.) With what a broad concave Cartilage is almost the whole Head of that Bone covered: (3.) How strong are the Ligaments with which it is fastened. (4.) How greatly is it defended with exceeding stout and thick Muscles. (5.) But how very brittle is the Neck of this Bone beyond any other Part thereof. From all which it appears, that the Neck must be far more frequently and easily broke, especially in Adults, than its Head dislocated^a. And tho' something of this Kind may sometimes happen, so as to make the Head of the Thigh-Bone slip out of its *Acetabulum*; yet that generally proceeds more from internal than external Causes^b. For we find it has been observed by very skilful Physicians, that the Ligaments of the Thigh-Bone, tho' very strong, may be by various Causes, and particularly by a Flux of Humours, so relaxed and weakened, as to let the Head of that Bone slip spontaneously out of its *Acetabulum*: So that it should seem no great Wonder if the Thigh should be sometimes luxated even

The Thigh seldom luxated.

^a To these we may add that the celebrated CHESLEDEN in his Anatomy says, that upon opening two Subjects, whose Case every body thought to be a Luxation, the Neck of this Bone was found fractured. And WISEMAN, with other eminent Surgeons, wholly deny any Luxation in this.

^b RUYSCH observes that the Head of the Thigh-Bone is seldom dislocated by external Force; but frequently by Humours from within. See his *Thesaur. Anatom.*

while

while the Patient lies in Bed, without any external Violence, as I have sometimes seen; so that when they rise, one Leg appears longer or shorter than the other, and seems as if it were unhinged. *Vid. Hippoc. Aph. 59, 60. § VI. ZWINGER Theat. Pract. Part. II. pag. 110. sub tit. Luxatio.*

Happens oftener in Infants than Adults.

II. But this Case does not happen so easy in robust Adults, as in such as are more young and tender, as we before observed. For I remember to have several Times observed this Case of a spontaneous Luxation, though other Physicians and Surgeons were of a contrary Opinion, because they could not find that any external Violence had gone before: But though it was preceded by no external Violence, Experience has taught me, that the Head of the Thigh-bone may thus slip out of its *Acetabulum*; being the Consequence of preternatural Humors, or some other Disease, whereby the Ligaments and Articulation are rendered infirm.

When the Thigh is luxated, it is generally perfectly so.

III. Whenever the said Head of the Thigh-bone is thrust out, it is almost always wholly displaced, so as to make a perfect Luxation. The exact Roundness of this Head, with the great Force of the circumjacent Muscles, and the Narrowness of the Sides of the *Acetabulum*, will not admit the Bone to be dislocated a little way only: For as soon as the Head of this Bone is thrust up to the Edge of the *Acetabulum*, it must unavoidably either turn quite out, or else fall back again into its right Place^a. Yet there are some who hold that the Thigh may suffer an imperfect Luxation.

The Thigh may be luxated in several Directions.

IV. The Thigh is usually luxated four Ways; *upward, downward, backward, and forward*: But it is most frequently dislocated downwards and inwards, towards the large *Foramen* in the *Os Pubis*^b. For besides that the cartilaginous Defence on the lower Part of the *Acetabulum* is not so high as the rest, the *Ligamentum rotundum* is found to give way more easily in that Part than any other: And lastly, the adjacent Muscles are found to be weakest in their Resistance on this Part, being insufficient to keep the Head of this Bone from slipping out. And then there is a certain Eminence in this Edge of the *Acetabulum*, which keeps the Head of the *Os Femoris* from falling back again into its right Place. But if the Head of this Bone be displaced outwards, it generally slips upwards at the same time; it being scarce possible but the very strong Muscles of the Thigh must then draw the Bone upwards, and then there is no Eminence there, in the Edge of the *Acetabulum*, to resist the Head of the Bone in that Passage. But should it at any time be luxated by an external Force, there must certainly be a Rupture of the round Ligament; as some Authors have observed.

Signs of the Thigh luxated (i.) downward and forward.

V. When the Thigh is dislocated forwards and downwards, which is what usually happens, the Leg hangs straddling outward, and is longer than the other: Also the Knee and Foot turn outwards: The Head of the Bone itself will be felt near the lower Part of the *Inguen* and *Os Pubis*. Sometimes there is a Suppression of Urine in this Case; when some Nerve, which communicates with the Bladder, is violently compressed. In the Buttock may be perceived a Cavity, from the *Trochanter Major* and the rest of the Bone being displaced: And if the Thigh-bone be not timely replaced into its *Acetabulum*, the whole Limb withers

^a See WISEMAN'S Surgery, pag. m. 463.

^b As VERDUG has observed, *Operat. Chirurg.* pag. m. 300.

shortly afterwards^a. And this is the Reason why the Patient can bear little or no Strefs upon that Limb, but must always incline and throw the Weight of his Body upon the other, unless he would fall down. In like manner when they walk or go forward, the Person must move that Limb in the Form of a Semi-circle; but as for the Body itself, it is obliged to be supported under the Arms by Assistants, or else by Crutches and Sticks. Though there are not wanting particular Cases, some of which I have been Witness to, where the Head of the luxated Thigh-bone has grown so firmly to the adjacent Parts without the *Acetabulum*, as to become, in process of Time, so strong as to support the Body without Crutches or Sticks, though they always halted in walking.

VI. But if the Thigh-bone be displaced backward, it is usually drawn up-ward also at the same time, as we before observed. Hence there will be perceived a Cavity behind the *Inguen*; but upon the Haunch or Buttock, a Tumor; because the Head and *Trochanter* of this Bone will be thrust there. The Tumor in the Haunch being thrust upwards, the rest of the Limb will become shorter than the other, and the Foot will seem to turn inwards: The Heel will not touch the Ground, and so the Person will seem to stand upon his Toes. And lastly, the luxated Limb may be bent with more Ease than extended: Also the Body is usually sustained more firmly by this Limb when luxated backward than forward; because in the first Case, the Feet are removed farther from each other. And this is the Reason why a great many in Cases of this Kind which have been cured by Surgeons without reducing the Bone, are able to stand firmly and walk, especially if they have a Shoe with a very high Heel to it. But there generally follows something of a slight withering or decay in the Limb afterwards, from the Nerves being in some Measure Compressed: Though this Accident is much slighter here than at § V. Lastly, it is extremely rare that the Thigh is luxated forward or backward, without being also drawn upward or downward, as we before observed: But if it should so happen, it may be evidently discovered by what we have been just now saying, and from considering the Structure of the Articulation.

VII. As it is very difficult to discover whether the Thigh-bone be dislocated or fractured, both by feeling and inspecting, because of the great Thickness of the Muscles and Integuments; it is therefore, in my Opinion, a Matter of some Consequence to propose the following Signs, which we recommend for discerning one from the other. We do not without Reason judge the Thigh to be luxated (1.) when we find the Ligaments of the Bone have been relaxed by some preceding Congestion of Humors, and when no external Violence has been exerted upon it, especially in young Patients: (2.) When neither the Symptoms, Pain, Tumor, or Inflammation follow: And lastly, (3.) when the whole Limb may be bent and turned about at the *Acetabulum* without any crushing of the Bones, which is otherwise common in Fractures. The contrary of these Signs are strong Indications that a Fracture is present: More particularly if the Foot in grown Persons be shorter, from the Injury of any external Violence, and you hear a grating of the Bones in moving the Limb.

VIII. If it be difficult to discover whether the Thigh be fractured or luxated, as we have before made evident; its proper Treatment and Cure will be found much more so. See *Book III. Chap. I. § IX.* For this Difficulty there are many Reasons. For (1.) the Force and Thickness of the adjacent Muscles

^a See HIPPOCRAT. Sect. V. *Aph.* 59, and 60.

How to distinguish between a Fracture and a Luxation of the Thigh.

Prognosis.

themselves hinder the Thigh from having a sufficient Extension; especially if it be in the stronger Sort of Men. Hence, (2.) for the same Reason the Reduction of the Bone will be very difficult to effect; and when it is effected, it will be a hard Matter to discover. And (3.) if the Thigh should happen to be replaced quite home as it should be, yet there is great Danger of its slipping out again, from the Laxity of the Ligaments and Slipperiness of the Parts. To which we may add (4.) that the Ligaments happen to be sometimes quite broke or lacerated from the Greatness of the external Violence. And we must not forget that (5.) the Mucilage of the Joint becomes often so inspissated in the *Acetabulum*, as not only to prevent its Reduction, but often also, to thrust it out again when once replaced, (6.) in Infants the Head of the luxated Bone increases, and at the same time the *Sinus* contracts; that if there be not a speedy Reduction, there can be none. So that it is no Wonder if such become halt or lame, as have their Thigh-bone luxated, and reduced not at all, or else when it is too late. Yet in this Dislocation in a younger Patient, if it be recent, and the Ligaments are not broke, there are Hopes of reducing it; especially, if you apply proper Remedies. For in this Stage of Life the Muscles are very pliant, and the Bone is easily extended, and replaced: But it is not so easily retained there, in consequence of the Weakness and Flaccidity of the Parts.

Cure of the
Thigh lux-
ated forward
and down-
ward.

IX. The luxated Bone is always to be replaced in a Method agreeable to the Nature and Direction of the Dislocation. When it is displaced forwards and downwards, the Patient is to be laid flat upon his Back on a Table: Then a Linen Napkin or strong Sling is to be made fast over the Groin about the Part affected, so that one End of the Sling may come over the Belly, and the other over the Nates and Back, to be both tied together in a Knot upon the Spine of the *Os Ileum*, and afterwards fastened to a Hook fixed in some Post, or held firm by some Assistants; rather the first, if we use the *Polyspaston* or Pulley, to retain the Patient's Body firm from giving way in the Extension. In like manner, at the Bottom of the Thigh, a little above the Knee, there must be also fastened another Napkin, Sling, or the Girt of HILDANUS at *Tab. VIII. Fig. 17.* with a Compress between it and the Thigh; or PETIT's Sling, *Plate X. Fig. 8.* Both the Slings being drawn tight, the Thigh is to be extended, not vehemently, but only so much as is sufficient to draw the Bone out of its *Sinus*, that it may be replaced into its *Acetabulum* by the Surgeon's Hands: One Hand is to press the Head of the Thigh-bone outward, while the other conducts the Knee inwards: Or, the Reduction may be made by Napkins, fastened round the Extremities of the Thigh like Slings, much as in a Luxation of the *Humerus*; which will be more likely to succeed, if the Knee be at the same time pressed inwards by the Hands. When the fore-recited Means are not sufficient to make the Extension, it will be necessary to make Use of the *Polyspaston* or Pulley which we proposed before in *Book II. Chap. VIII. §IV.* As soon as the Thigh is found to be sufficiently extended, the Surgeon must take particular Care to restore the luxated Head of the Thigh-bone with his Hands from the *Os Pubis*, into its former Seat.

X. Whenever the Thigh is luxated backward, the Patient is to be placed flat on a Table, with his Face downward, and the Thigh is to be extended in directly the same Manner, but a little more strongly than we just now proposed: and the Reduction is to be effected afterwards by the Surgeon's Hands, an Assi-
stant

stant in the mean time extending the Limb, and turning it inwards. By this Method the Head of the Thigh-bone generally slips very readily again into its *Acetabulum*. This being all rightly effected, the next Business is to let the disordered Limb be well bound up, as we shall teach in the Doctrine of Bandages, and the Patient is to be closely reconciled to rest in his Bed for three or four Weeks, not without the Use of strengthening Medicines.

XI. But in either Case, whether the Thigh be luxated forward and downward or backward and upward, PETIT greatly recommends his Machine before described in the Chapter on a Luxation of the *Humerus*; because the Hand and other Instruments are here very often insufficient, because of the many strong Muscles in this Part. But to make use thereof, the *Retinaculum* or Stay delineated at *Tab. X. Fig. 7.* is required to be not so broad, and it may be without the Opening A, (See *Plate X. Fig. 9.*) as the Thigh is not to be transmitted through it: But the Middle thereof is to be applied to the Tubercle of the *Ischium*, one End being folded behind, and the other before. The Patient is to be placed on his sound Side, that the luxated Thigh may lie upwards; but the Machine itself is to be placed between the Thighs, the Knee of the distorted Side being a little bent. The Sling *Fig. 8. Tab. X.* is to be fastened firmly round the lower Head of the Thigh, above the Knee, the Skin being first drawn tight upwards, as we advised before in a Luxation of the *Humerus*: It is then to be firmly fastened to the Rope passing round the Pullies of the Machine *Fig. 6. d d.* And lastly, the Legs or Horns of the Machine *a a*, are to be put through the Apertures in the *Retinaculum D D, Fig. 7.* and by winding up the Rope by the Hand E, *Fig. 6.* it is to be gradually and carefully extended, till the Surgeon perceives by the Limb that it is sufficient. This done, the Surgeon strives to reduce the Head of the Thigh-bone into its *Acetabulum*, from the *Sinus* where it was lodged, as we have before directed at § IX.

The Use of
PETIT'S
Machine.

XII. But more particularly, if the Thigh be luxated forward and downward, and sticks near the large *Foramen* in the *Os Pubis*, the Reduction in this Case is often very difficult. PETIT has in this Case substituted for the Legs or Horns of the Machine *a a Fig. 6.* others which are expressed at *Fig. 10.* which have at their Ends transverse or lunar Processes: One of these A, he applies to the *Os Ileum*, and the other B, to the Middle of the Thigh: He afterwards ties a Napkin about the Thigh, near the *Inguen*, which he makes fast to the Rope about the Pullies of the Machine. He then makes the Extension by turning the Handle of the Machine, by which means the Instrument exerts its Force in three different Places: The Part A retains the Patient firm and resists the *Os Ileum* as an immoveable *Fulcrum*; the Part B, when the Rope is drawn tight, turns the lower Part of the Thigh inwards; but the Napkin, which is fastened about the upper Part of the Thigh, does by means of the Rope draw it outward; all which Motions are necessary to be performed, in order to reduce this Luxation. But be cautious against too strong an Extension, because the Limb is already too long of itself: Yet the Extension ought to be continued till the Surgeon can replace the Bone from the *Sinus*, where it was lodged, into its *Acetabulum*: For if it be let loose before this is effected, the Extension will be found to have been altogether useless, and must be repeated again.

More parti-
cularly in a
Luxation
forward and
downward.

XIII. If it should suffer an imperfect Luxation (which yet very seldom, if ever happens, as we observed at § III.) and if the Head of the Bone should stop upon the lower Part of the *Acetabulum*, the upper Part of the Thigh is then to be thrust outwards with one Hand, while the lower Part is pushed inwards by the other, and so the Bone may be properly reduced. But if the Head of the Thigh-bone should stick upon the Edge of the *Acetabulum* backward, a Method contrary to the former must be made use of; *viz.* the upper Part of the Thigh must be thrust inwards by one Hand, while the other Hand conducts the lower Part of the Thigh outwards.

XIV. When the Bone is replaced, it must be retained by the Application of a proper Bandage, called *Spica Inguinalis*, which you will find described in my Treatise on Bandages. And in younger Patients, where the Mischief arises from a Flux of Humours, strengthening Medicines must be given. And for the Revulsion of those Humours an Issue should be made in the Arm of the sound Side; to which such Virtues are attributed, that to this only MULLER ascribes the Cure of these Luxations in young Patients. See his Dissertation on Dislocations of the Thigh, delivered at *Hale* in the Year 1738.

C H A P. XI.

Of a LUXATION of the PATELLA and KNEE, or TIBIA and FIBULA.

Luxation of
the Patella.

I. **T**HE *Patella* is usually luxated mostly on the internal or external Side of the Joint; but if we may credit some Physicians, it is also sometimes displaced both above and below the same. But whenever the Knee is perfectly luxated, the *Patella* can scarce avoid being displaced at the same time, because of its strong Connection to the Thigh and *Tibia*. I must confess there are more than a few among the common Surgeons, who, from their Unskillfulness in Anatomy, and particularly Osteology, are quite doubtful and at a Loss what to think about this Case; nor can they tell what is dislocated when it happens. Hence it is no wonder if they treat this unknown Hurt of the Joint, as a Luxation made in the Knee itself, putting the Patient into various and painful Postures, and torturing him by extending and pressing the Limb to no Purpose. But if one well versed in Anatomy and the Structure of the Articulation should examine the Case with a little more Exactness, there is no room to doubt but from comparing the disordered and sound Limb, he will be able to judge readily whether or no, or in what Part the *Patella* is luxated, and what Method will be proper to be taken for its Cure.

How it is to
be replaced.

II. The Reduction of a luxated *Patella* is usually no very great Difficulty, if the Patient be laid flat on his Back upon a Table or Bed, or if he be laid in that Posture upon an even Floor, so as that the Leg may be pulled out strait by an Assistant. For then the Surgeon may firmly grasp the *Patella* with his Fingers, and afterwards press it strongly into its right Place; which may be also effected if the Patient stands upright. When this is done, there remains nothing but to carefully bind up the disordered Part, and to let the Patient rest quietly for some Days, sometimes gently bending and extending his Leg to pre-

vent

vent it from growing stiff: 'Till the Pains are gone off, and the Limb has recovered its former Strength.

III. A Luxation of the Knee is properly so, when the *Tibia* recedes from under the *Femur*. The Leg is sometimes luxated from the Basis of the Thigh-bone, either on the out or inside, or backwards: Seldom or never forwards, unless it be forced and driven very violently that way; because forwards, the *Patella* is bound against the Articulation, by the very strong Tendons of the Muscles which extend the Leg. Nor is it easy for the Bones of the Leg to be wholly displaced from that of the Thigh, so as to make a perfect Luxation; by reason of the great Strength of the Ligaments, and the two deep *Sinuses* which receive the Head of the Thigh-bone: Unless those very strong Ligaments should happen to be broke insunder at the same time. And this seems to me to be the Reason why People, who suffer a perfect Luxation of the Knee, are generally tortured with such violent Pains and Convulsions, that they are wholly spent or wasted thereby: Or, if they should escape that, they are generally troubled with Lameness and Stiffness in the Joint. But on the contrary, the slighter the Luxation, or the nearer it approaches to an Imperfect or Subluxation, the more easy it is generally to effect the Reduction and Cure. Yet I myself reduced, some Years since, at *Helmstadt*, a perfect Luxation of the *Tibia* backwards, and that in a robust and jolly Patient, without any other Inconvenience, than his perceiving a Tumor and some Pain in his Knee for a few Weeks: Which were afterwards entirely removed by emollient Fomentations and Cataplasms; and his Leg is perfectly sound to this Day.

Luxation of the Knee.

IV. For the rest, as this kind of Luxation is very easy to discover from the thin covering of the Joint, with the Tumors and Cavities which follow; so, when it is discovered, it is as difficult to make a perfect Cure thereof, without letting the Bones join together; or leaving some Stiffness in the Knee; which first Accident is usually called an *Anchylosis*. For it is scarce possible, that this Case should happen without greatly lacerating or confusing the Ligaments and Glandules which belong to this Articulation, so that their nutritious and mucilaginous Juice being inspissated in the Articulation, prevents the natural Motion of the Joint.

V. When the Knee is but slightly luxated, the Patient is to be seated on a Bed, Bench, or Table, and one Assistant holds the Thigh firm above the Knee, and the other extends the Leg; but the Surgeon in the mean time replaces the Bones by his Hands and Slings, if necessary, (as in the Reduction of the Arm, *Plate X. N. III.*) or pushes it by the Application of his Knee into its natural Place. If the Hands and Slings be not sufficient for this Purpose, it will be necessary to make use of the Instruments before described in *Book II. Chap. I. N. XXI.* as the Girt of *HILDANUS*, and the *Polyspaston* or Pulley, *Tab. VIII. Fig. 15* and *17.* But we must be very careful here, not to make the Extension so violent in Children and young People as to separate the *Epiphyses* from the Bones to which they are not yet firmly united: For by that means a worse Disorder and Lameness will be brought on. After the Luxation of the Knee is rightly reduced, it is to be properly bound up, and placed in a Straw Case; and the rest must be managed as we have before directed concerning the *Patella*, *N. II.*

How it is to be replaced,

VI. Some-

Luxation of
the *Fibula*.

VI. Sometimes the *Fibula* is separated by some external Violence from the Thigh-bone, and is then distorted either upward or downward: And this generally happens, when the Foot has been luxated outward. Therefore whenever this is the Case, there is need of Extension: The Bone is to be first restored to its natural Place, and then properly bound up, the rest of the Cure being to be carried on as we directed at N. IV and II. 'till it be grown firm again to the *Tibia* and Leg. Lastly, Patients should be frequently cautioned not to use or bear any Strefs upon the disordered Leg too soon; unless they would throw themselves into a worse Disorder, an incurable Lameness.

CHAP. XII.

Of a LUXATION of the FOOT and ANCLE.

Luxation of
the Ankle.

I. **T**HE Ankle may be sometimes luxated either in Jumping, Running, or Walking, and that in all four Directions, inward, outward, backward, and forward. Which of these Ways it happens to be luxated, may be discovered by the particular Posture of the Joint: For when it is luxated internally, the Bottom of the Foot is turned outward; and on the contrary, when it is luxated outward, the Bottom of the Foot is turned inward: Which latter Case happens much more frequently than the other. If it should be dislocated forward, the Heel becomes shorter, and the Foot longer than it should be: If backward, the contrary Signs will appear. Lastly, the Ankle can scarce possibly be luxated outward, unless the *Fibula* be separated from the *Tibia*, or else quite broke, which may happen on the external Ankle. An Example whereof may be seen in LE DRAN; *Obs.* 109.

Luxation of
the Ankle
dangerous.

II. Nor is it uncommon for a Luxation of the Ankle to be attended with the most grievous Symptoms, especially when occasioned by some very great external Violence. For it is scarce possible for it to happen otherwise in this Case, since the Distortion of the Foot must overstrain the adjacent Ligaments, Tendons, and Nerves, and thence excite most violent Pains: Or the Veins and Arteries may be also lacerated; by which means there will be a large Extravasation of Blood about the whole Foot, which often gives rise to a Gangrene. Of this Accident DIONIS give an Example in his Book of *Surgery*. Nay, sometimes Death has ensued from this Kind of Luxation, as TULPIUS has remarked, in *Obs. Med. Lib. IV. Obs. 50.* Who also quotes HIPPOCRATES on that Subject, *Lib. de Art. XII. Hist. 48. & Lib. V. Epid.*

The Ankle
is sometimes
only contu-
sed.

III. But it seems to be here worth notice, that the Ankle is not always luxated after it has been violently strained by leaping, or turning the Foot on one Side. For it sometimes happens in those Cases, that the Ankle is not dislocated, but retains its proper Place, only the Parts are violently contused and strained: In which Case the Patient may happen to be afflicted with the most sharp Pains, great livid Tumor and Stiffness, so that he can neither stand nor walk, but is obliged to keep his Bed for a long Time. Hence, to attempt an Extension and Reduction in this Case, would be altogether useless and improper.

IV. The

IV. The Ankle is more or less difficult to reduce in Proportion to the Violence of the Cause by which it is luxated. It is a general Observation, that Opposites are usually the Consequences of Opposites. But the most ready way of reducing a Luxation of the Ankle is to place the Patient upon a Bed, Seat, or Table, letting the Leg and Foot be extended in opposite Directions by two Assistants, while the Surgeon strives to reduce the Ankle with his Hands and Fingers. When the Foot is by this Means once replaced, it is proper to bind it up carefully, after it has been well bathed with *Oxycrate* and Salt, advising the Patient to keep to his Bed a good while, 'till the Disorder and its Symptoms quite leave him, and he finds his Ankle to have recovered its Strength so far as to sustain the Weight of his Body without any Uneasiness or Danger.

How the Ankle is to be reduced.

V. But in a Contusion or great Strain of the Ankle, it will be not improper to plunge it suddenly into cold Water, and to repeat it for several Days. If any should not care to undergo the Action of the cold Water, I would persuade him to apply Compresses dipped in *Oxycrate* which has had Salt dissolved in it, binding them on and renewing them often upon the disordered Part. DIONIS runs directly into this Method of Cure. He applies what the Surgeons call a Defensative, made of the White of an Egg and Oil of Roses, and Allom, beat up together, which being spread on Linen, he binds firmly upon the Ankle, repeating it frequently. In about three Days after, he makes a Decoction of aromatic and astringent Medicines, as Roses, Wormwood, Rosemary, Granate Peels, and Allom, in Wine; and with this foment the Ankle well, and applies Compresses dipped therein, binding them on tighter than before. This continued about a Fortnight, he then applies some strengthening Plaster, 'till the Pain and Weakness vanish,

How a Contusion of the Ankle is to be treated.

VI. So stubborn and unmoveable are violent Strains of the Ankles in some People, that they will give way neither to the Skill of the Physician, nor Virtue of Medicines, but are only to be removed by Length of Time. Instances are not wanting, where the Foot has been so greatly disordered, a Year after the Luxation, that the Patient could not walk in a way the least uneven, nor go up and down Stairs without great Trouble. To remedy this Disorder, the same is to be carefully observed here, which we observed before at N. IV. The Bandages which are proper here, we shall describe hereafter.

A Contusion of the Ankle sometimes difficult to cure.

VII. Sometimes it happens, that only the *Os Calcis* or *Calcaneum* is luxated by some external Force, and that either towards the internal or external Side of the Foot. Which ever way it happens, when there is Pain and Inequality of the Member, that is, when it has a Cavity in one Part, and a Tumor in another, there is strong Reason to suppose a Luxation. And as soon as it is discovered, the same Method of Cure is required with that before recited, keeping the Limb quiet for some time afterwards.

Luxation of the Calcaneum.

VIII Lastly, If any other Bone in the Foot, the *Tarsus* or *Metatarsus*, should happen to be luxated by some considerable external Violence, the Ligaments with the adjacent Nerves and Tendons are generally so affected as to excite not only most acute Pains, but violent Inflammations and Convulsions: And even Death itself has been observed by some Physicians to be the Consequence, unless the Bones were speedily replaced. It is therefore the safest Way to reduce the Luxations in these Bones of the Foot, by the Method we before proposed.

Luxations of the other Bones of the Foot.

proposed for those of the Hands, and that with the greatest Expedition. So when any of the Bones in the Toes are dislocated, there is nothing more required than what we proposed before in those of the Fingers. We are however, in the last Place, to recommend the Patient to rest quietly in his Bed for a sufficient Time afterwards.

An EXPLANATION of the TENTH TABLE.

Tab. X.

Fig. 1. Is a Sling which may be used to make an Extension in Luxations of the Head. See the Chapter on Luxations of the Head.

Fig. 2. Is another Sling, to retain the Patient's Body firm in the same Case.

Fig. 3. Shews the most commodious Method of reducing a recent Luxation of the *Humerus*.

A, Is the *Patient*, seated ready to undergo the Operation.

B, Is the *Assistant*, that holds the *Patient* firm in his Seat.

C, Is the *Assistant*, that extends the dislocated *Humerus*.

D, The *Surgeon*, reducing the dislocated *Humerus*.

E, A Napkin, whereby the Surgeon elevates the Arm, in order to its Reduction.

Fig. 4. Is a Machine, commonly called the *Ambe* of HIPPOCRATES, used formerly to reduce Luxations of the *Humerus*: It consists of the *Fulcrum* AA, to which is fastened the moveable Leaver BC, joined to each other by a sort of moveable Articulation D.

Fig. 5. Shews how the former Instrument is to be applied to a Luxation of the *Humerus*. There is some Difference between the Structure of this and the former, at the Joint CD: Some think this is preferable to the last.

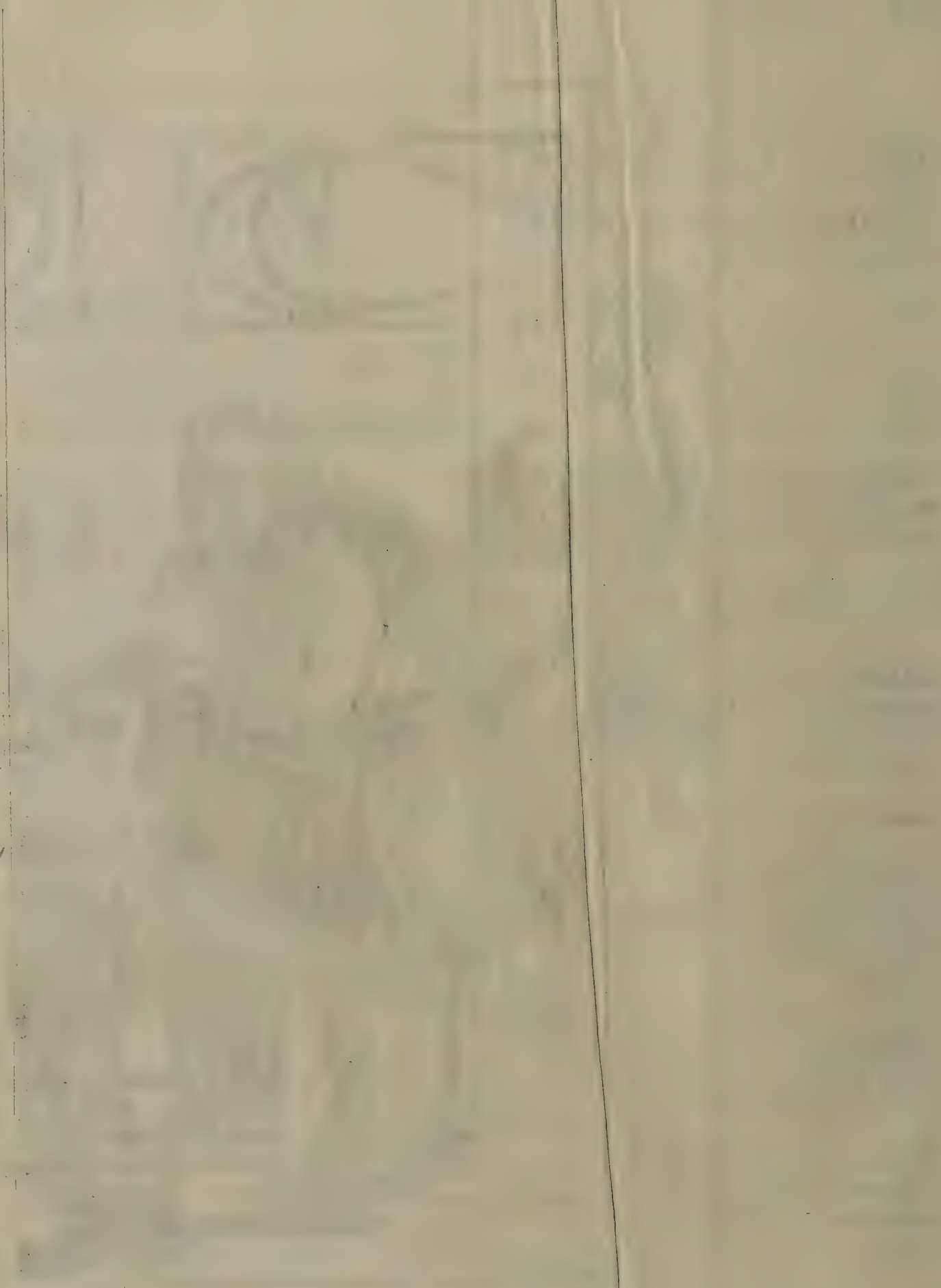
AA, Is the *Fulcrum*; BC, the Lever, to which the luxated Arm is fastened by the three Ligatures EEE. D, the Place where the *Fulcrum* and Lever are fastened together by a moveable Joint. When the End of the Lever B is pressed downwards, the luxated Arm is extended, and lifted up near its *Scapula* E.

Fig. 6. Is PETIT's Machine for reducing Luxations of the *Humerus*, and several others.

a a, Are two Arms or Horns, by which the Patient, and particularly his *Scapula* is held firm, from giving way in the Extension; B, the other End of it, resting upon the Ground or Floor. CC, are the Pullies of the Machine: *d d*, the Rope, by winding up which, an Extension is made. E, is the Handle, which being turned round, draws the Rope tight, and extends the Limb. FF, the Place where the two Horns are joined to the Body of the Machine.

Fig. 7. Is a *Retinaculum*, or Supporter, to be used in a Luxation of the *Humerus*. A, is an Opening or Slit in the Machine. BC, the Form of it at each End. DD, two Apertures, through which the two Legs or Horns *a a* of the Instrument *Fig. 6.* are to be passed.

Fig. 8. Is a particular Sling of Mr. PETIT's, proper for extending luxated Limbs. AA, the Part made with Leather; *b b b*, a Silk Ligature, sewed to the Leather in three Places at 1, 2, 3. The Part AA is fastened round the Arm;



Arm; *cde*, is a strong Loop fastened to the Silk Ligature at *ff* so as to be moveable.

Fig. 9. Is another Kind of Supporter to be used in reducing the Femur, when luxated outwards: It differs from that represented at *Fig. 7.* being without the Aperture *A* in the Middle. *B* and *C* are the two Cavities, by which the Arms are fixed to the Machine.

Fig. 10. Is an Instrument recommended by PETIT for the Reduction of the Femur when dislocated inwards. It is to be fastened at *FF* in the Machine *Fig. 6.* instead of the two Arms *aa*. The Part *A* is applied to the *Os Ileum*, and the Part *B* to the Middle of the Thigh: But *CC* are fixed into the Machine *Fig. 6.* at *FF*.



INSTITUTIONS OF SURGERY.

PART I. BOOK IV.

Of TUMORS.

CHAP. I.

Of TUMORS in general.

A Tumor
what.

I. **A**NY Part of the Body which is preternally enlarged, is, by Physicians, called a *Tumor*. But whether there be any such Enlargement, in what Part it exists, and of what Kind it is, may be discovered by examining the Parts, not only by Inspection, but more particularly by Feeling. And notwithstanding it has been the general Custom to refer *Excrescences*, as Warts, Corns, and such as grow in the Nose and *Pudenda*, to the Class of *Tumors*; yet because they grow not from beneath, but out of or upon the Skin itself, it seemed proper here to treat separately of Tumors, properly so called. We shall take Notice of the most remarkable Excrescences, when we treat of Chirurgical Operations.

Kinds of
Tumors.

II. There are Tumors of various Kinds, distinguished by particular Names, according to the different Causes from whence they proceed, and the particular Parts wherein they are seated. Some are called *hot*, others *cold* and *watery*; some again are termed *windy*, other *scirrhus*: And lastly, the Physicians call some *benign*, other *malignant*. There are some Tumors which are contained in a proper membranous Bag, and are therefore called *cystic*: And if this should be in an Artery, 'tis usually termed an *Aneurism*; but when in a Vein, a *Varix*. In the Veins of the *Anus* or *Rectum*, the Disorder is termed *Hæmorrhoides*: But if the Tumor be in the *Scrotum*, *Inguen*, or at the *Umbilicus*, it is generally called a *Hernia*. If any *Pus* or Matter is contained in the Tumor, it is then by the Surgeons termed an *Abscess*. Lastly, if the Tumor is seated on a Bone, Physicians usually call it an *Exostosis*.

Kinds of In-
flammation.

III. The forementioned Classes of Tumors are all of them generally subdivided into several other Kinds. Thus the hot and burning Tumors, which are the same with Inflammations, are generally termed *Phlegmons*, when violent, and seated in the common Integuments; but when slighter, they are commonly called

called *Furuncles*. The Inflammation which is not fixed deep, but spreads only superficially upon the Skin, is usually distinguished by the Name of an *Erysipelas*; and the inflammatory Tumor that arises at the Fingers Ends is termed *Paronychia*. When the Inflammation fixes in the Groins or Arm-pits, the Tumor is called a *Bubo*; but when under the Ears, *Parotis*. If a great Inflammation seizes the Hands and Feet from extreme Cold, *Chilblains* arise. Other Inflammations have also particular Names, according to the particular Part of the Body they possess. Hence, in the Writings of Physicians, we frequently find Accounts of an Inflammation of the Breasts, Eyes, Tonsils, Testicles, Arms, Feet, &c. And this may suffice for a short and general Account of the Kinds of Inflammations: The various other Sorts of Tumors we shall explain hereafter.

IV. Before we proceed farther into the Consideration and Treatment of Tumors, it will be first proper to take notice, that we do not intend here to handle all Sorts of Tumors to which the Human Body is subject, but only such as are external, and of the slighter Kind. We intend first to examine those Tumors only which are to be cured by manual Operation, and topical Remedies, and so come properly under the Business of Surgery: Neglecting at the same time such Tumors whose Cure is to be expected chiefly from the use of internal Medicines; as is usual in some internal Inflammations, *Scirruses*, Dropsies, and the like. We shall also refer those Tumors which require Instruments and great Skill in their Treatment, to the Part of Chirurgical Operations: Such are *Herniæ*, *Ecrescences*, *Strumæ*, *Scrophulæ*, the *Paronychia*, *Cystic Tumors*, *Aneurisms*, *Varices*, *Hæmorrhoides*, and others. Our chief Concern here will be to treat of *Inflammations*, *Schirrus*, *Cancer*, *Œdema*, *Tumors of the Joints*, and other external Tumors. We begin with Inflammations.

CHAP. II.

Of a PHLEGMON

I. **A** *Phlegmon* or external Inflammation is, when any outward Part of the Body is preternaturally enlarged, and attended with a Burning Heat, Pain, Redness, Resistance, and a continual Pulsation and Pricking. Upon a due Consideration whereof, we may pretty readily perceive the Reason why the Disorder came to be distinguished by this Name. If we enquire into the proximate Cause of this Inflammation, we shall find it generally rises from too thick or viscid a State of the Blood, stagnating in the *Anastomoses* of the smallest Arteries and Veins: So that the Blood being sent in larger Quantities than it can pass through those Vessels, must of consequence excite the forementioned Symptoms, and must occasion great Disorder at every Part where such Stagnation is made. And though no Part of the Body, whether external or internal, nor the Bones themselves are exempt from this Kind of Inflammation; yet it more frequently happens in the Fat and Glands than elsewhere.

What a
Phlegmon is.

II. We just now observed, that the immediate Cause of this Inflammation was an Obstruction or Stagnation of the Blood in the smallest Order of Vessels. But if we enquire into the Causes from whence that Inspissation and Stagnation

Causes (i.e.)
external.

of the Blood in those Vessels proceeds, we shall, upon Examination, find them to be of two Kinds: Of which, the first Sort may be called external, and the latter internal. Amongst the *external Causes*, we place in the first Rank, all Wounds, Fractures, Luxations, Contusions, Punctures by Thorns and Splinters, with a too great Compression of the Vessels, whether by too strict a Bandage, or otherwise: Each of which obstruct the Passage of the Blood through its minute Vessels, by either dividing, bruising, compressing, or distorting them. To the fore-mentioned Causes we must add Burns of all Sorts, extreme Cold, too violent Motion of the Body, the external or internal Application of sharp and stimulating Substances, sticking Plasters, oily and fat Things, with Abundance of the like Nature, which stop up the invisible Pores of the Skin, and impede the free Course of the Blood.

(2.) Inter-
nal.

III. Amongst the *internal Causes*, we reckon any thing acrimonious in the Fluids, as in the Scurvy: Because these so irritate, corrode, prick, and contract the very small Veins and Arteries, that the Blood is thence by degrees obstructed in them. But the same also frequently happens from the Blood abounding in too great Quantities, or being of too thick a Consistence; or lastly, when it circulates in the Body with too violent a Motion. For by this Means the grosser Particles of the Blood are drove, and, as it were, wedged into much smaller Vessels than they can readily find a Passage through; and this more especially when a sudden Cold is spread over a Body that is in a great Heat. In short, every thing will produce an Obstruction, which makes the Parts of the Blood too gross and bulky, or too much contracts the Mouths of the small Vessels.

What Share
an Acid and
Fermenta-
tion, have,
as Causes.

IV. As this is the State of the Case, with regard to the Causes of Inflammation, I think the Opinion of some modern Surgeons, who suppose the chief and sole Cause of the Obstruction to be an *Acid* in the small Vessels, appears to be very evidently erroneous. For besides their Inability to discover whether and where this Acid hides itself, it is very apparent from what we have here delivered, that great Obstructions may be brought on by a long train of very different Causes. The same may be said with regard to *Fermentation*, which has been formerly patronised by many as a grand Cause in Inflammations and Obstructions: For there could never yet be found any such Fermentation in the Blood.

The Symp-
toms of In-
flamma-
tions.

V. We observed at § I. that an Inflammation was generally attended with Tumor, Heat, Redness, and Pain, and very often with a Resistance and constant Pulsation. To investigate the Causes of which Symptoms, we shall meet with no great Difficulty, if we strictly and accurately examine the Disorder itself. When the Blood is obstructed in its Passage through some of its smallest Vessels, it must necessarily move faster through the rest; for the smallest Arteries are never all obstructed, but in a *Sphacelus*. The general Consequence then must be, a swifter Circulation of the Blood through all its other pervious Vessels in the Body: Hence the Arteries must beat quicker, swell larger, and thence excite great Heat. When we find a Patient in this State, we say he has a small Fever; which is usually accompanied, for the first Days, with Thirst, Head-ach, Restlessness, and the other common Attendants of a Fever. If we bleed the Patient in this Case, when his Blood is cold, it appears covered with a tough, and whitish Crust or Skin, not greatly unlike the Skin of fresh Pork. As the Disease and Heat increase, each of these Symptoms become more violent: Till at last, the

the whole Mass of Blood being deprived of its most fluid Parts, is converted into a tough and glutinous Body, as will be more apparent from our Observations at the Operation of Bleeding.

VI. Inflammations terminate variously according to their different Degrees of Violence, the Causes from whence they arise, the Parts which they affect, and the particular Constitution of the Patient, with several other Circumstances, which also presage to us what will be the End of the Inflammation. But the several Ways wherein an Inflammation terminates, are chiefly four. It is either (1.) so dispersed and resolved as to vanish without leaving any considerable Injury in the Part affected, which afterwards recovers its former Vigour, and is of all the best Course it can take. Or else (2.) the Inflammation suppurates and degenerates into an *Abscess*, so as to leave ever after some Damage in the Organ. Or else (3.) the Inflammation degenerates into a *Gangrene* or *Sphacelus*. Or (4.) lastly, into a very hard Tumor, commonly called a *Schirrus*, which grows more compact in the Part affected as the Inflammation remits or goes off.

The several Ways by which an Inflammation terminates.

VII. As to the Resolution or *Dispersion* of an Inflammation, that is usually practicable when it is only of a milder Kind, in a sound Habit of Body, when the Blood is not yet too viscid nor vehement in its Motion. But *Suppuration* follows, when the Inflammation is more violent, the Circulation more rapid, but yet the Mass of Blood somewhat temperate, and without much Acrimony: That is, when the Blood becomes somewhat more inspissated, and its larger Particles sticking in the minute Vessels, can find no Passage; by which means the very small Vessels are distended and burst by the Pressure and Impulse of the obstructed Blood, so that their Contents are extravasated in the Fat, Flesh, and adjacent Parts. Upon this Extravasation the more subtile Parts of the Fluids putrify by the great Heat, they become foetid, acrimonious, and corrode all around them. The Fluids thus changed and corrupted, are then by the Surgeons called *Pus* or Matter: Of which there are several Kinds, according to its different Colour and Consistence; being either white, yellow, greenish, reddish, or party-coloured.

How it may be (1.) dispersed, or (2.) suppurated.

VIII. The Inflammation generally terminates in a *Gangrene* (which CELSUS and the *Latins* term *Cancrum*) when the forementioned Symptoms are much more violent, and when the Blood is at the same time more acrimonious and rapid than it ought to be. For, in that Case the small Arteries and Veins are corroded, and burst or broke: Hence all the adjacent Parts are dissolved and corrupted by the acrimonious and extravasated Humours; and particularly the Skin is very subject to be filled with Pustules, when its *Cuticle* has been separated, as in Burns. The *Sanies* contained in these Pustules and elsewhere, is usually termed *Ichor*; which is generally of a pale reddish Cast, being sometimes flesh-coloured, and sometimes brown or livid, which is the worst of all. For unless the Patient in these Circumstances be timely assisted, the forementioned Symptoms of Inflammation go off, the Tumor, Resistance, Heat, Redness, Pain, and Pulsation gradually disappear, and the afflicted Member grows flaccid and cold: It afterwards turns pale, becomes dead and insensible, and the Inflammation creeps to some other Part. If this Case should chance to be treated with Medicines too hot, astringent, cooling, fat, acrimonious, or narcotic; or if the Parts should be bound up too tight, the Flesh then quite dies, its Paleness turns to a livid or leaden Colour, sometimes resembling the Rind of Bacon. In the mean time the inclosed *Sanies* finds no Vent, becomes more acrimonious, and

Or end in (3.) Gangrene, or (4.) Schirrus.

so greatly corrodes the adjacent fleshy Parts, as wholly to destroy all Sense and Motion throughout the Limb; whereupon follow a *Sphacelus*, or entire Corruption of the Member. But if the inflamed Part be full of Glands, and the Blood very thick, glutinous, and inspissated; the small Blood-vessels are then so strongly stuffed up with the glutinous Blood, that they are compacted together, the Parts lose their Sensation, and are converted into a *hard* Tumor, which is thence called a *Schirrus*. This may be sufficient concerning the four several Ways wherein a *Phlegmon* may terminate: But it remains that we shew the particular Method of Treatment and Cure proper in each of those Stages.

Of the Resolution or Dispersion of INFLAMMATIONS.

In what a
Dispersion
thereof con-
sists.

IX. Though the Methods used to cure Inflammations may be various, according to the several Causes and supervening Symptoms, with other various Circumstances: Yet, as the Inflammation constantly arises from an Inspissation of the Blood in its smallest Vessels, the grand Intention of each of those Methods should be, to open such small Vessels as are obstructed, and to restore the Blood to its natural Consistence and free Circulation. This has been commonly termed Resolution or Dispersion. Therefore, whenever the inflammatory Signs, mentioned § V. are gentle, it is much the best Way speedily to conclude about dispersing it: The right Method of performing which, we are now going to lay down.

Removal of
the external
Causes.

X. If the Cause of the Inflammation is found to be external and obvious to the Senses, as Thorns, Splinters, the End of a Sword, Bullets, or any other foreign Body stuck in the Part; nothing can be more serviceable than to speedily and carefully remove whatever is lodged there, if it can be done with Safety. So also when the Inflammation proceeds from a too strict Bandage in Wounds, &c. or from a Luxation or Fracture; the first and principal Business is, to speedily relax the Bandage, or else to set the Fracture, or reduce the Luxation.

Treatment
of a slight
Inflammation.

XI. When the external Causes are once removed, the next Thing to be considered is, whether the Inflammation be mild, or violent. If mild, there is no occasion for Bleeding, or strong Purges: The End is generally answered, by applying Compresses, dipped in Spirit of Wine, with a little *Sal Ammoniac*, or Lime-water, and some Spirit of Wine camphorated, to the inflamed Part, and repeating them warm at proper Distances. Likewise Oxycrate, or Cabbage-pickle, or a Decoction of Wormwood, Southernwood, &c. in Wine or Sea-water, applied in the same manner, are of wonderful Efficacy in removing slight Inflammations.

Bleeding and
Purging to
be used.

XII. But where the Inflammation is violent, it is very useful to open a Vein, either in the Arm or Foot, and to draw off a large Quantity of Blood, proportionable to the Strength and Habit of the Patient; giving afterwards a brisk Purge, not one that heats the Body, but judiciously accommodated to the Age and Constitution of the Patient. Both these are very necessary here, and if the Symptoms do not remit and grow milder, they must be repeated at Discretion. But I would advise the Surgeon in this Case, where he can, to call in the Advice of some prudent Physician: Because it may be otherwise carried on to Excess, as many do among the *French*, or else not made sufficient to answer the Intention. The most proper Purges for these Cases, we have mentioned before (at

Book I. Chap. XV. § XIV, *seqq.*) in speaking of Inflammations arising from Contusions. But in very mild Inflammations, or where the Patient is of a weak Habit, or has lost much Blood by a Wound, or any other Cause, Phlebotomy and even Purging itself seems to be quite improper. On the contrary, when the Inflammation is great, and the Patient strong, it is almost incredible of what great Service a prudent Administration of laxative and discutient Medicines may prove.

XIII. To resolve and attenuate the inspissated Blood in the small Vessels, exceeding great Benefit will be found by giving internal Medicines, which are watery, diluent, cooling, and attenuating; because Bleeding alone, which the *French* rely too much upon, is frequently insufficient, unless it be joined with a proper Regimen and Diet; by which means any Acrimony in the Blood may be mollified and taken off. But all Aliments which are of a difficult Digestion, such as are pickled or salted, with all Spices and fermented Liquors, or any thing else that may heat the Blood, are to be strenuously and altogether avoided. Such internal Medicines are most proper here to cool and qualify the Blood, as are commonly given with Success in continual ardent Fevers, or internal Inflammations, as the Pleurisy, Measles, &c. Such are the absorbent Powders of *Lap. Cancro. Conch. pp.* neutral and nitrous Salts, cooling and diaphoretic Mixtures and Julaps, made of distilled Waters, subacid Juices and Syrups, also thin Emulsions, made of the four cold Seeds. But the bezoardic and spirituous Tinctures prescribed and recommended by some in this Case, are so far from being serviceable, that they encrease the Inflammation in the Blood, and raise a new Fire.

XIV. With regard to the particular Regimen and Diet, the most proper *Aliment* seems to be Broths and Drinks, made with Barley, Oats, or Flower, also Viper's Grass, Succory, Chervil, Sorrel, Lettice, Endive, Apples, and Vegetables of the like Nature; in the Decoction of which may be mixed the Juice of Citrons or Vinegar, to communicate a grateful Sharpness, and temperate the inflammatory Heat. Hence roasted Apples, or Cherries, and Plumbs boiled, are very wholesome for inflammatory Cases, where they sit easy upon the Stomach. The most proper *Drinks* are such as are thin, watery, and cooling, made of a Ptisan or Decoction of Barley, Oats, or Bread, and to give it a pleasant Taste, Apples may be used, or some acid Syrup. But when the Inflammation is violent, it will be proper to add a small Portion of Nitre^a. Of these may be drank plentifully in proportion to the Thirst and Heat: But Care should be taken not to let the Patient over-drink himself. Ale and strong Wine should be wholly abstained from: But if they are of the smallest Sort, and the Patient has a strong Desire for them, he may be gratified without any great Danger; especially if a Slice or two of a Citron be infused therein. Besides the foregoing, it may be not amiss, for Variety, to use Coffee and Tea, &c. If the Patient should happen to be of a cool and phlegmatic Habit, it may be not improper to add some of the milder Sort of Spices to his Drink, as Cinnamon, Sassafras, Mace, Anniseeds, and the like: Or the Patient may be ordered to infuse some proper medicinal Herbs in the Manner of Tea, or a very weak Decoction of Sassafras; the

^a HARRIS recommends the following Drink, as of great Service in Inflammations: R. Nitri ℥j. Pulv. Coction. gr. xii. Aquæ Simp. lb. iij. Sacch. ʒj. m. f. Potio; Cujus bibat Aeger. ʒv. vel vi. 3tia vel 4ta quæque hora.

drinking of which will promote a gentle *Diaphoresis* or Perspiration. For by this means whatever is glutinous in the Blood, will be readily attenuated and resolved, and the Blood will recover its free Circulation.

External
Medicines.

XV. Nor is there less Care required in the Application of *external Medicines*. For though some Physicians use nothing but heating Remedies, and others only cooling Medicines, to appease the Inflammation; yet both of them, when applied indiscriminately, may prove both useless and pernicious. For one Medicine is not to be applied to every Patient, but particular Remedies are to be suited to the Strength and Constitutions of particular Patients: Or else Injury might follow upon the Application of hot Medicines to hot Constitutions, and the contrary. I therefore look upon it to be Matter of Consequence to observe diligently, that cooling Medicines be applied to such as are of a hot Temperature. Among the Coolers, the principal are *Acetum Lithargyrifatum*, applied warm by Linen Rags folded together; or *Acetum calidum minio Bolove permixtum*; or *Oxycratum ex æquis aceti et aquæ portionibus confectum*. Of each of those Liquors may be taken, for Example, ℥vi. *Salis communis* ℥j. *Nitri vel Salis Ammoniaci* ℥ij. Let them be mixed, and applied to the affected Limb with Linen Cloths. Among the vulgar, common, or domestic Medicines, the *Stercus bubulum recens atque calidum aceto calidiori admixtum*, is an Application very easy to be had, and of no small Efficacy: Pickled Cabbage-leaves, Broth, Brine, &c. are also sometimes used with Success to the inflamed Limb. Some prefer cooling Plasters, as the *Emp. ad Ambusta, de Minio, de Lithargyro, Diapompholygos, Saturninum, &c.* These Plasters may do pretty well in the slighter Inflammations, for such Patients as have a good Opinion of Plasters; particularly they will do very well in the Night-time, when the Preparation and Application of Fomentations are difficult and troublesome.

Remedies
proper in
cold or
phlegmatic
Habits.

XVI. In cold and phlegmatic Patients, *Sp. Vin. rectificat. Sp. Vin. Camph. vel pauxillo Theriac. permist.* are very successful in dispersing Inflammations, being often applied by means of hot Cloths: So is also the *Aqu. Calcis, vel Mera, vel cum Sp. Vin. Camph. Aq. Reg. Hungar. Bolo, Cerussa, Lap. Calaminari, Sale Ammoniaco, aut Lythargyro permixta*. A Mixture of *Sp. Vin. ℥bj. and Sapon. Venet. vel Hispan. ℥ij.* being applied warm, gives place to hardly any Medicine for dispersing an Inflammation. Lastly, there are many Herbs proper for this Purpose, as *Scordium, Absinthium, Mentha, Sabina, Abrotanum, Matricaria Flor. Tanacetii, &c.* which may be discretionally made into a Decoction with *Aq. Sal-sa, Marina, vel Calcis*. With this Decoction may be mixed *Sp. Vin. Rect. vel Camph. & Sap. Venet.* by which means its Virtue will be increased. The fore-mentioned Herbs may be also commodiously boiled and made into a Cataplasm, and applied in the same Manner with the rest of the Medicines, *i. e.* by Linen Cloths folded together, and bound round the disordered Member.

External
Applications
how to be
made.

XVII. There remains one Thing to be especially observed, with regard to the Application of external Medicines in this Case: Namely, that each of them must be always applied hot, and never be permitted to grow first cold. The Inflammation also disperses generally much more speedily, when the disordered Limb is first rubbed well with a Cloth dipped in some warm discutient Fomentation, before any fresh Cataplasm be laid on. And this Method is to be continued, till the Inflammation be either wholly dispersed, or else brought to an End by Suppuration or a Gangrene.

XVIII. In the mean time the Surgeon should carefully observe, that the Apartment where the Patient lies be neither too hot nor too cold, but be kept as near as possible to the Degree of temperate Air, also to reconcile Rest and Sleep to the Patient, and to let him not be kept awake too long. Lastly, to let the Patient keep his Mind free from pernicious Passions, as Anger, Fear, Care, great Thought, &c.

What sort of Life the Patient should lead.

CHAP. III.

Of SUPPURATION and ABSCESS.

I. **W**E observed before, that the second Way in which an Inflammation went off, was, by Suppuration; that is, a Conversion of the inspissated Blood, and the soft adjacent Parts (as the small Vessels and Fat) into Pus or Matter: Which Disorder, when it has not yet found an Opening, is generally called by Surgeons an *Abscess*.

Suppuration what.

II. An Inflammation may be known to tend to Suppuration from the Signs beforementioned at Chap. II. § VII. which generally happens, when the Inflammation has been of long standing when the Surgeon is called in, or when it cannot be dispersed by the Use of the forecited Remedies.

Signs of Suppuration.

III. As soon as we find it tend to Suppuration, we must wholly lay aside the Use of resolving Medicines: And we must strive, (1.) to forward the Inflammation to Maturity, *i. e.* to convert the stagnating Blood into laudable Matter: Then (2.) to procure a Discharge or Vent for this suppurated Matter. (3.) To let the disordered Part be well cleansed from all that is corrupted. And lastly, (4.) to incarn, agglutinate, and heal the wounded Part.

What is to be done in Case of Suppuration.

IV. As to forwarding the Inflammation to *Suppuration*, that is to be promoted by particular maturing Remedies. Among which, the best seem to be such of the Emollients as obstruct the Pores of the Skin, as Fats, Oils, glutinous and slippery Medicines; as also the Application of sharp, pungent, and somewhat caustic Medicines, made up and used in the Form of a Cataplasm: Or Plasters of the like Kind may be applied to the disordered Part.

Maturation, how promoted.

V. Among the emollient Medicines for this Purpose, there are several Kinds of Herbs, Fruits, Seeds, and Meals that may be here enumerated: As the *Althæa*, *Malva*, *Lilia*, *Parietar.* *Verbasc.* *Branca Ursina*, *Solanum*, *Hyoscyamus*, *Ficus*, *Semen Lini*, *Fœnu-græci*, *ejusdemque seminis Farina*; *Farina item triticea aut siliginea*, *Panis primarii & secundarii Micæ*, *Vitelli Ovorum*, *Butyrum*, *Mel*, *variorumque animalium pinguedines vel adipēs*, *Oleum Lini*, *Olivarum*, *Liliorum alborum*, *Chamæmel.* and many others of the like Kind. As to the other Class of Maturaters, which are sharp, pungent, and stimulating, but also emollient at the same time, there may be reckoned *Chamæmelon*, *Melilotum*, *Cepæ sub cinere tostæ*, *Allium*, *Crocus*, *Terebinthina*; *variaque gummata*, *Galbanum inprimis*, *Ammoniacum*, *Bdellium*, *Opopanax*, *Sagapenum*, *in vitellis ovorum resolutum*; & denique *fermentum panis*.

Simple maturative Remedies.

VI. From a proper Mixture of the now recited Simples, may be made various and useful Cataplasms and Plasters for this Purpose. It may be not unacceptable here to instance a few of the most proper and efficacious of these compound Maturatives.

Compound Maturatives.

1. $\mathcal{R}$ *Herb. Malv. Alth. Parietar. Chamæmel. aa Mj. Farin. Sem. Lini vel Fænugræci* $\mathfrak{z}$ ij. *Coq. leni igne aqua vel lacte, ad consist. Cataplasmatibus, postea add. Fermenti panis* $\mathfrak{z}$ ij. *Gum. Galban. in vitell. ovi resoluti* $\mathfrak{z}$ j. *Dein linimentorum convolutorum adminiculo, calida, & quam sæpissime quidem supra læsum membrum deligantur. Vel,*
2. $\mathcal{R}$ *Fol. Malv. Branc. Urfin. aa Mij. Caricar. Pinguum contusar. N^o vj. His eadem, ut modo retulimus, ratione decoctis adde butyri recentis, nec non ceparum sub cineribus tostatarum, aa* $\mathfrak{z}$ ij. *& denique farinæ sem. lini, quantum quidem ad Cataplasma conficiendum sufficit, admiscendum. Vel,*
3. $\mathcal{R}$ *Rad. Lilior. alb.* $\mathfrak{z}$ ij. *Herb. Parietar. Mercurial. Melilot. aa Mj. Ficuum recent. contus. N^o vj. Hæc in aqua penitus concoquantur, admixtisque Gum. Ammoniac. & Sagapen. in vitellis ovorum solutor. ut & aceti boni aa* $\mathfrak{z}$ j $\mathfrak{ss}$. *in Cataplasma quoddam convertantur. Vel,*
4. $\mathcal{R}$ *Farinæ Siliginæ, aut Triticæ M. ij. vel iij. coq. in s. q. lactis admisc. Gum. Bdellii & Opopanacis cum vitellis over. subactior. aa* $\mathfrak{z}$ j. *ut & Croc. $\mathfrak{z}$ j. in Cataplasma transmutentur. Vel,*
5. $\mathcal{R}$ *Fermenti panis* $\mathfrak{z}$ ij. *Mellis* $\mathfrak{z}$ j. *Saponis Veneti comminuti* $\mathfrak{z}$ $\mathfrak{ss}$. *Olei Lilior. alb. q. s. F. super leni igne Cataplasma. Vel,*
6. $\mathcal{R}$ *Mellis* $\mathfrak{z}$ iv. *ad lentum ignem ex aqua decoquantur: His postea Olei Lini aut Chamæmel pauxillum, ut & Farinæ Siliginæ aut Sem. Lin. quantum ad malagma parandum satis est, admisceatur.*

These Cataplasms, or others of the like Nature, are to be often applied hot to the Part affected, till the Matter within appears to be sufficiently digested or matured by the Softness and Whiteness of the Tumor. But when the Abscess is of the smaller Kind, it is every way more commodious to apply some maturative Plaster, as *Empl. Diachyl. cum Gum. vel & Emplastrum ex melle & farina compositum*. These may be applied to the Part affected, till Suppuration ensues.

Internal
Medicines
proper to be
used,

VII. In the mean time, when the Patient's Condition requires it, we must be careful to temperate the Motion of his Blood, not by external Applications only, but also by internal Medicines and a proper Regimen. When the Blood moves too slowly, as may be known by the Pulse, the Patient should moderately use Meat, Drink, and Medicines which are warm and stimulating: By which means the inspissated Blood contained in the small Vessels may be the more easily converted into Matter, by the increased Motion of the Blood. Strong Broths, Wines, and Ale are also very effectual for the same Purpose. But where these are insufficient, and the Pulse indicates that the Motion of the Blood is still slower, it will be proper to order the *Theriaca, Diascordium, or Alkermes* to be taken a Bit upon the Point of a Knife several Times in a Day, or dissolved in Wine, Cinnamon Water, or some other Cordial Liquor. In the mean time we must not neglect the *Tinctura Bezoard. Essent. Alexipharm. Diaphoret. Essent. Cinnam.* with other warm cardiac and comfortable Essences, Spirits, and medicated Teas, by infusing a few Sassafras Chips, Red Sanders, Cinnamon, &c. But on the contrary, when the Motion of the Blood appears by the Pulse and great Heat to be too violent, then cooling Medicines must be directly ordered, to assuage and temperate the Heat and Motion, and to prevent a Gangrene.

To this Head belong all Sorts of thin and watry Drinks, with subacid Medicines and absorbent Powders with Nitre, as we mentioned in *Chap. II.* § XI. It is also sometimes proper in this Case to open a Vein, and bleed a little. Lastly, when the Strength of the Constitution is not impaired, but remains firm, and the Motion of the Blood and Pulse appear to be neither too swift nor too slow; unless there be some urgent Symptom, the Use of internal Medicines to promote the Suppuration, seems to be wholly unnecessary, if the Patient keeps up to a proper Regimen.

VIII. With regard to opening the Abscess and discharging its Matter, it is a Caution very necessary to be observed, that the Opening be not made too soon, before the Matter has arrived at a perfect Maturity. For else, the Discharge of the Matter will be not only impeded, but the Part will, in all Probability, be flung into a greater Inflammation. This has indeed been the common and constant Practice hitherto; but some of the Moderns (among whom is GOUVEUS a *Frenchman*, p. 259. of his Surgery) will have it proper to open the Tumor directly, without waiting a Suppuration, if it cannot be quickly dispersed: Which I also find to have been the Advice of CELSUS (p. 408.) formerly. But to return, an Abscess is known to be sufficiently ripe, when the Tumor, which before resisted, feels soft and pliant; when it turns pale or of a yellow Colour; when, upon applying the Fingers, you perceive a Fluid to be lodged within; when the Pain, Redness, Heat, and Pulsation go off, wholly or in Part, and the Sensation of a Heaviness or Weight seizes the disordered Part in the room of the former. Yet sometimes there are Abscesses, as I myself have more than once experienced, when the Skin does not change its Colour; but on pressing the Tumor you perceive a Softness, and a fluctuating within. In these Cases the other Surgeons and Physicians were either doubtful of the Abscess, or flatly denied it: Nevertheless, when I opened the Tumor, there flowed out immediately a large Quantity of Matter. When the above-mentioned Signs appear, the Abscess must be opened in the most prominent and depending Part without more Delay: For Delay generally proves of a worse Consequence than opening it too soon, tho' both of them are bad. For when the Matter is retained longer than it should be, in a large Suppuration and nervous Part, there is Danger lest the corrupted Matter should corrode the adjacent Parts, and produce *Fistulae* or a *Caries* of the Bones; or by insinuating itself into the small Vessels, and corrupting such Parts of the Blood as it mixes with, it may excite ill-conditioned Fevers; or lastly, by disturbing the Functions of the Brain, Lungs, Liver, and Kidneys, it may bring on Inflammations and Suppurations, and at length Death itself. Sometimes the most subtile Part of the Matter perspires, and only the grosser Parts are retained behind, which gives Rise to hard Tumors, especially in glandular Parts. Since these must therefore be the Consequences, if the Abscess be not timely opened, the Surgeon's great Care must be to use the proper Opportunity, and to make an Opening by the usual Methods where the Skin appears to be the thinnest. The Methods for making this Opening are principally two, either by *Incision* with the *Scalpel*, or by making an *Eschar* with a *Caustic*.

IX. The Parts which are not suppurated are to be incised in the following Manner. The Surgeon is to grasp the Basis of the Tumor with one Hand, pressing the Matter outward towards the Skin, to avoid hurting any Vessels or

When the Abscess ought to be opened.

How the Incision is to be made.

Nerves in the subjacent Parts; he is then to make the Incision by the sharp Scalpel (*Tab. I. A or B*) in his right Hand; making the Opening in the softest and most depending Part of the Abscess, that the Matter may have the freer *Exit*. When the Abscess is large, the Scalpel is not to be taken out as soon as the Opening is made, but the Incision in the Skin is to be further enlarged with it; but with so much Caution as to avoid the larger Vessels and Nerves, with the Muscles of the subjacent Parts. The Abscess thus opened, the Putrid Matter is to be let out; and when it is glutinous and thick, it may be gently pressed forth with the Hands. But if the Quantity of Matter contained be very large, and the Patient not bold enough to bear the Knife, but faints away, which is often the Case; then the best Way seems to be, to discharge the Matter in Part, and fill up the Cavity with Lint: And after the Patient has been recovered by *Aq. Reg. Hungar.* or some other Cordial, to complete the Dressing with a Plaster, Compress, and Bandage, leaving the perfect Discharge and Cleansing thereof to the next Dressing. But if no *Deliquium* happens, the Matter may be all discharged at one Time. The remaining Treatment of this Ulcer is to be the same as we have directed before in Wounds. In the first Place, the Abscess is to be cleansed with Digestives: Afterwards Sarcotic or Balsamic Medicines are to be applied, till the Wound is filled up internally with new Flesh, and externally closed or cicatrized. Tents, particularly of the harder Kind, must be here cautiously avoided, as they generally produce Ulcers which are very difficult to cure. It is much safer to fill up the Cavity with Dossils of Lint, and to remove them once or twice a Day as there is more or less Matter.

How the
Matter may
be dischar-
ged by a
Caustic.

X. The other Method of opening an Abscess is, by means of a Caustic or corrosive Medicine; and is generally used for Children and such as are of a tender Constitution, who are very much affrighted at the Approach of the Knife or Scalpel for Incision. Among these caustic or corrosive Medicines, the most commendable and proper are, the *Lap. Caust. ex cineribus clavellatis & calce viva vel ex lixivio Saponariorum paratus*: Also the *Lap. Infernalis*, *Butyrum Antimonii*, and such like, of which there are such Abundance, that almost every Apothecary and Surgeon has now his proper Caustic, made after his own particular Method, which is supposed to excel the rest. The *Lapis Causticus* is to be applied to the Abscess either whole in the Lump, or else beat small, as may best suit the Occasion: But then a defensative Plaster must be first applied to the Abscess, perforated with an oblong narrow Aperture, much as we have delineated in *Tab. II. Fig. 11*. For thus a proper Provision is made against the spreading of the Caustic beyond its due Bounds, making its way through the Skin only in a small or narrow Compass. Over the Caustic is to be applied a Compress of Lint or Linen, over the Compress a large Plaster, and over the Plaster a still larger Compress of Linen: And to keep all on firm, a proper Bandage must be applied. Things being thus managed, the Patient is to compose himself to rest for a while, and the Dressing should not be taken off from the Abscess for the Space of several whole Hours. Three Hours is the least, but sometimes it requires four, five, or six Hours to make an Outlet to the Matter by Caustics, in Proportion to the Thickness of the Skin and Strength of the Medicine. When the Caustic is judged to have remained long enough upon the Abscess, the Dressing must be then taken off, that the noxious Matter may be discharged: But
if

if the Caustic has not sufficiently penetrated, the Opening may be forwarded and enlarged by gently applying the Scalpel, Probe, or Spatula, that all the Matter may have a free Passage. But as soon as the Caustic has made an Eschar or Crust, it must be mollified by applying *Butyrum recens, Ung. Digest. vel Balsilic.* to be retained by a Plaster and Bandage. When the Eschar is found loose or separated, the rest of the Treatment must be the same with that we mentioned before, in opening the Abscess by Incision. But to say Truth, without Dissimulation, I must acknowledge it my Opinion and Advice, that the Knife is greatly preferable to the Caustic, as being more neat, expeditious, and safe, and the Aperture heals with a smaller and neater Cicatrix: So that most prudent Surgeons do, with Reason, always propose the Knife before a Caustic, using the latter only in Cases of great Timidity, and where the first cannot be conveniently admitted.

XI. That our Reader might not be at a Loss for the Composition of the *Lapis Causticus*, we thought it would not be amiss here to lay down a short and approved Method of making the same. *R. Ciner. Clavellat. & Calc. viv. fortiss. aa ʒvj. vel. Ciner. Clavellator lbj. Calcis vivæ ʒvj.* These being pulverised separately^a, and afterwards mixed together in a large Glass, or Earthen Vessel, are there to be dissolved in a good deal of Water, letting them stand an Hour or two to melt perfectly. Then the Liquor with what it has dissolved, is to be filtrated through a Linen Cloth from its gross Sediment, evaporating it afterwards in an Iron Pan over the Fire. The consistent Mass, left after Evaporation, is to be put in a Crucible, and melted with a strong Fire, so that it may flow like Oil. It may then be cast into a Mortar or broad Pan, and either cut or beat into small Pieces before it is quite cold, which are to be put into a Glass very close stopped, and preserved in a dry Place for Use. When an Abscess is to be opened, a sufficient Quantity of this is to be taken and applied, either whole or in Powder, and bound upon the Skin, as we observed before. If the Caustic be wetted, it generally acts a great deal sooner, so as to corrode the subjacent Parts, and make an Eschar in an Hour or two. But when it grows old, by long keeping, it commonly loses its Force, so that at length it cannot corrode at all. Other and no contemptible Method, of preparing this Caustic may be seen in the Chemistry of LEMERY, in the *Leyden Chemical Collections*, and the Surgery of DIONIS, *Edit. 2. p. 709.*

The Caustic
how prepar-
ed.

CHAP. IV.

Of TUMOR and INFLAMMATION in the BREASTS.

I. **W**E have been hitherto treating of Suppuration. Our next Business was to have proceeded to a Gangrene: But as there are several Kinds of Inflammation and Suppuration which do not commonly terminate in a Gangrene, it was proper first to treat of these separately, before we came to the Consideration of a Gangrene. We begin with those Inflammations which

What hap-
pens in an
Inflamma-
tion of the
Breasts.

^a BOERHAAVE, in his *Materia Medica* Sect. 412. takes *Ciner. Clavell. ʒiv. Calcis vivæ ʒvj.* and uses another Method of Preparation, which did not succeed with me. You will find a more compendious Preparation of it in the *London Dispensatory: Ex Calcis vivæ lbj & Cinerum Clavellat. lbj.*

usually

usually afflict the Breasts, being a Disorder most incident to Child-bearing Women, and almost constantly happens in a few Days after their Delivery. If the Milk should be impelled into the Breast too plentifully and forceably, which at such Times frequently happens, and if the Mother should then be seized with great Cold, Fear, or Anger, the sanguiferous and lactiferous Vessels being thence obstructed, the Breasts must then become inevitably tumified, and at the same time they will be afflicted with great Heat, Redness, Resistance, and violent Pain. The same Accident sometimes happens to Women that give suck, even a long Time after their lying-in: Which proceeds from the same Causes which we just now mentioned; and is also sometimes the Case of those who have no Milk. I have even observed the same Case in a Man of a weak Habit, which arose from a great Fright: One Breast was vastly tumified, and turned to an Abscess, from which, upon the first Opening, I extracted above two Pounds of Matter, to the great Surprise of the Patient and the By-standers. This Kind of Inflammation is usually attended with a Fever or great Heat all over the Body, followed with a quick Pulse, Thirst, Head-ach, and difficult Respiration: And this in such a Manner, that a Shivering generally proceeds in its Invasion.

The Causes
of an In-
flammation
in the
Breasts.

II. The general Causes of Inflammation in the Breasts of Child-bearing Women, are usually, as we hinted before, a sudden Cold taken when the Body is very hot or in a Sweat, cold Drink, Anger, Fear, Grief, and any other violent Perturbation of the Mind, from whence the Blood and Milk may become inspissated and obstructed in the small Vessels of the Breast. And tho' the Inflammation of the Breasts happens most frequently in Women, especially such as have lately lain in, and either will not suckle the Infant or cannot; or when the *Fœtus* died in the Womb, or soon after the Birth, in which Cases it proceeds from the Stagnation of the Milk brought on by Fear and Grief: Yet it may frequently happen from the same Causes in such as have left off giving suck for a considerable Time, as also from a Blow, Contusion, or some other external Injury of the like Nature.

The Differ-
ence of
these In-
flammations.

III. These Inflammations do not always happen to be equally intense and violent: For sometimes it seizes the whole Breast, sometimes only one Side, and greatly tumifies it with violent Pain: But then again, at other Times it occupies only a small part of the Breast. In one Patient the Inflammation lies very near the Skin; in another spreads very deep. At one Time the Inflammation has very urgent Symptoms, as violent Pain, Heat, Redness, and Tension; but at other Times it sits very easy upon the Part.

Prognosis.

IV. He that is desirous to be an able Prefager in the Events of this Kind of Inflammation, should first carefully consider the several Symptoms of the disordered Part now mentioned. For as the Tumor is less, and the Inflammation and Fever slighter, the more gentle and happy is like to be the Consequences, and the less is the Danger. For in that Case there is room to hope it may be dispersed, without coming to Suppuration. But on the contrary, the more violent the Symptoms, the greater is like to be the Suppuration: Sometimes it turns to a *Scirrhus*, and a *Scirrhus* commonly ends in a Cancer of the Breasts.

Inflamma-
tions of the
Breasts, how
to be treated.

V. This Disorder may be very readily prevented in Women of Condition, and such as cannot, or will not, suckle their Children, if some of the *Emplast. de Spermate*

Spermate Ceti spread on Linen be applied warm all round upon the Breast soon after Parturition, being perforated in its Middle to transmit the *Papilla* or Nipple; the Accession of the Milk being also repelled by a pretty strict Bandage. It may be also not improper in this Case to hang the *Galaetites*, or some *Argentum vivum* inclosed in a Nutshell, about the Patient's Neck, down the Back; and to apply *inter Scapulas Emp. ex Spermate Ranarum, Saccharo Saturno, Oleoque Hyoscyami permixtum*. Among the internal Medicines, the most proper are such as bring down the *Lochia Puerperarum*, when they do not flow in sufficient Plenty of themselves. The principal for this Purpose are *Essent. Myrrhae, Succin. Essent. Croc. Elix. proprietat. &c.* taken now and then in a proper Dose. Lastly, with respect to the proper Diet, it must be carefully observed to diminish the Quantity of Milk by the Smallness and Poverty of the Meat and Drink. Upon which account the Patient should be recommended to drink nothing but small Broth, Tea, or the like watery Liquors, for many Days together, 'till the Afflux of Milk to the Breasts is found to be sufficiently weakened. But if the lying-in Mother be desirous of suckling the new born Infant herself, there can be no better Preservative for her against Inflammations of the Breasts, than to keep free from Colds, and to cautiously avoid all violent Affections of the Mind, letting the Child suck frequently at proper Seasons to prevent the Milk from Stagnation. Besides this, Care must be taken to use Plenty of small Broth and thin Fluids for the first Week or two: By which means the Milk will not be so abundant, nor apt to be inspissated in the lactiferous Ducts of the Breasts.

VI. But when Inflammation and Tumor have already fixed themselves in the Breasts, the Surgeon's principal Business is, to use all Endeavours to discuss whatever stagnates in the small Ducts and Vessels with the utmost Expedition, both by internal as well as external Medicines; in order to prevent the Tumor from running into Suppuration or a *Scirrhus*. For when it suppurates, there generally remains an ugly Cicatrix, which is very disagreeable to most Women, but especially the more noble and elegant. As to the internal Medicines proper to be given to Childbed Women, to disperse Tumors in the Breasts, which are generally accompanied with a Fever, I would advise the Surgeon and Patient to consult some prudent and skilful Physician on that head: Lest the lacteal Fever (as it is generally called) carry off the lying-in Patient under an injudicious Treatment.

VII. As to the external Remedies, in which the Surgeon ought to be particularly skilled, the strongest discutient that I have frequently found to excel others for these Tumors, is, the *Emplastrum ex Sperm. Ceti præparat.* In the mean time it may be of some Service to lay over the Plaster a discutient Bag, made warm and stuffed *ex Furfure ac Sale, vel Flore Samb. Chamæmel. Melilot. Lavend. vel ex Sem. Fæmin. Cumin. Anis. &c.* There are some who put Lambs Skin over the Plaster instead of discutient Bags. Which not only defends the Breasts from external Cold, but is also no improper Discutient for what stagnates in them. But there is still a usual and very effectual discutient Application for these Tumors, which is a Calf's Bladder filled with a warm Decoction of *Flor. Samb. & Chamæm.* in Milk, which is to be often applied to the Breast, its Warmth being renewed as it is impaired. Of nearly the same Virtue is the *Emp. Diackyl. simp.* either alone or mixed with *Emp. de Sperma Ceti.* The *Rob. Sambuci*

Cure, (r) by
Dispersion.

External
Resolvents,

Sambuci or *Theriaca* mixed *cum Sale Absinthii*, being spread upon Linen, and applied in the way of Liniment, prove of great Efficacy in dispersing these Tumors, especially if they are applied warm, and covered with warm discutient Bags: But they are hard to be put up with among the rich and very nice Women, because they usually dawb the Skin, Cloths, and Bedding. To these we may add the use *Acet. Lithargyr. Acet. cum Semine Carui, Aq. Calcis*: Which are of very easy and considerable Use; being applied to the Breasts by means of Linen Compresses dipped in the Liquors while hot, and often repeated. A great many esteem it a ready and effectual Remedy to express the Milk upon burning Coals; nor do I think it proper to rashly reject this Method as wholly useless. For though this Sort of Cure seems to be sympathetical and superstitious; yet as it may excite a strong Imagination of drying up the Milk in the superstitious Woman, and that Imagination may have a considerable Influence, we see no sufficient Reason entirely to condemn it. But if the Breasts are internally very much distended with Milk, it will be proper to discharge it by the sucking either of an Infant, an old Woman, or a Puppy, or else by the Application of a Glass Instrument which we shall hereafter describe. The Milk should be thus discharged till the Tumor subsides and the Pain vanishes.

(2.) by Sup-
puration.

VIII. But when the Inflammation is greater than can be dispersed in the Space of four or five Days; or when, as it frequently happens, the Surgeon is consulted too late; the best way is to forward it to Suppuration as fast as possible, rather than hazard its turning to a *Scirrhus* or Cancer by Delay. If therefore the noxious Matter be not arrived at a State of Maturity by the use of the discutient Medicines, in order to accelerate the Suppuration there ought to be a speedy Application of an *Emp. Diachyl. cum Gumm.* or *Emp. de Hyoscyamo*. But more effectual Cataplasms are to be also made use of to digest the Matter, some of which we mentioned in the preceding Chapter, § 5 and 6. and others we shall also propose here. As,

1. *R. Farinæ Siligin. ℥℥ vel ℥j. Mellisque quantum ad Cataplasma conficiendum sufficit. Tum lactis & Croci paucillum admisceatur, califacitumque in patella quadam lineamentis obducatur, mammaeque superimponatur, ac sæpius postea renovetur. Vel,*
2. *R. Farinæ Siligin. ℥iv. Gummi Galbani vitello ovi resoluti ℥j. Aceti ℥iij. his aquæ tanta portio admisceatur, quanta Cataplasmati coquendo sufficit. Vel,*
3. *R. Fermenti Panis ℥ij. Mellis ℥℥. Saponis Venet. comminuti, & Olei Chamæ. ana ℥ij. quæ sibi invicem commixta in patellam conjiciantur, atque igni admota in pulticulam sive malagma convertantur.*

How the
Abscess is to
be opened.

IX. These Cataplasms are to be applied hot, and very often, to the Breasts; keeping them on by Linen Compresses or Bolsters, the better to retain the Heat, till the Tumor breaks of itself, which it often does in this Part, from the thinness of the Skin: Or else, when ripened, it may be conveniently opened by the Scalpel. But the Incision ought always to be made in the lower Part of the Breast, unless Necessity obliges it to be otherwise, lest there should be left a visible Cicatrix after the Cure. Though there are not wanting some Surgeons who use the Caustic for opening Suppurations of the Breast, yet, as they usually occasion indecent *Cicatrices*, we think the Knife is greatly preferable to such Medicines.

X. After

X. After the noxious Matter has been discharged from the Breasts, the rest of the Treatment is to be the same with what we proposed in the Cure of other Wounds and Abscesses. The Ulcer is to be first cleansed with some digestive Ointment, and afterwards healed with some Balsam, as the *Peruvian* for Example; with Oil of Eggs and Wax. But when the Suppuration has run very deep, the best way is to inject the Wound with a cleansing Decoction of the *Sanicula* or *Alchimilla* mixed with a little *Mel Rosarum*; and to prevent the Lips of the Wound from closing, before the Bottom is filled up with new Flesh, it will be proper to introduce a soft Tent, or some scraped Lint. As the new Flesh grows up from the Bottom, the Tent may be gradually lessened or made shorter, and, at last, wholly removed when there is little or no Occasion for it.

Treatment
after the
Discharge of
Matter.

XI. But it sometimes happens that Tumors in the Breasts of Child-bed and suckling Women will neither yield to Dispersion nor Suppuration, but will retain their ill Condition for the Space of several Months or Years. If this happens in young and healthy People, it occasions little or no Disturbance to the OEconomy: Nor is there great Danger of the Tumor's turning to a *Scirrhus* or Cancer, which the poor female Patient is often vastly afraid of. The Surgeon's Business here is to take Care to keep the afflicted Patient in good Heart by his Persuasions: And to the Tumor itself is to be applied *Emp. de Spermate Ceti cum Pauxillo Camphoræ*, vel *Diasapon cum Camphorâ*, to be constantly kept on, and the Breast must be carefully defended from the external Cold; by which means Tumors of long standing have grown gradually less, and at last vanished. But the Case is usually otherwise in Women, who are advanced in Years, and of a melancholy or sorrowful Disposition: For in such there is great Danger of the inveterate Tumor turning to a *Scirrhus* or Cancer.

What is to
be done
when the
Tumor can
be neither
dispersed nor
suppurated.

CHAP. V.

Of INFLAMMATION in the TESTICLES.

I. SOMETIMES an Inflammation and Tumor happens in one or both of the Testicles: Which, if it be any thing violent, generally tortures the miserable Patient with most sharp Pains.

Inflamma-
tion does
sometimes
happen in
the Testicles.
The Causes
of Inflam-
mation in
the Testicles.

II. This Disorder may arise from two Causes: Either from some great *external Violence*, as by a Fall, Blow, or Contusion; to which some are liable from mounting a Horse with too much Haste and little Thought: Or from a *venereal Cause*; chiefly when some of the venereal *Virus* inspissates the *Semen*, and obstructs its Course through the small *Tubuli* of this Gland.

III. An Inflammation of the Testicle is distinguishable from any other Disorder in these Parts, and particularly from a *Hernia Scroti*, when the Patient has previously suffered any of the Causes § II. and complains of a great Swelling, Heat, Redness and Pain in his Testicle, the same being confirmed to the Surgeon by Inspection: His Feeling will also acquaint him with the Nature of the Disorder: For, upon applying the Hand, one or both of the Testicles are found to be swelled considerably larger than they ought to be, exceeding sometimes the Size of one's Fist.

Diagnosis.

Prognosis.

IV. This Disorder is not of so slight a Consequence as is generally thought; for it very frequently turns out so as to deprive the Man either of his Life or Virility, by degenerating into an Abscess or *Sphacelus*: Or else it turns to a *Scirrhus* or Cancer, which have also Death for their usual Consequence: Or, lastly, it is followed by a *Sarcocoele* or *Hydrocele*, which are little less troublesome and fatiguing to the Patient.

Cure by Dispersions.

V. The same external Medicines will serve to resolve the Inspissations which happen in an Inflammation of the Testicle, which we before opposed to Inflammations in the Breasts: And above others we prefer *Acet. Lithargyrifat. Aq. Calcis cum Sp. Vin. Camph. cerussa, tutia, Lap. Calamin. permixt. vel & Farin. Fabarum cum Acet. Decoct. in Cataplasma*. But in the Night-time, when the Application of Fomentations is not so convenient, it will be proper to apply *Emp. de Ranis cum duplici Mercurio, vel Emp. Diachylum*. Nor are internal Medicines to be here neglected: For, if the Tumor arose from some external Violence or an Inspissation of the Blood, he should often take of the *Pulv. ex Lap. Cancror. præp. Test. Ostreor. Mat. Perlar. Cinnab. Arcan. duplicat. &c.* together with thin Drinks, as Tea, Decoctions of the Roots, Woods, and discutient Herbs. Plentiful feeding, Things which heat the Blood, and Aliment of difficult Digestion are to be carefully avoided. And if the Inflammation should be of the more violent Kind, it will not be amiss to mix a little Nitre with the forementioned Powder; and to drop some *Sp. Vitriol. Sulphur. &c.* into his Drinks; not neglecting to open a Vein in plethoric Habits.

Treatment when from a Venereal Cause.

VI. If the Disorder take its rise from some venereal Taint, it seems necessary to administer good brisk Cathartics, always adding a Quantity of *Merc. Dulc.* to them: At the same time such other Medicines should be used as are calculated particularly against the Venereal Disease itself. Warm Drinks made of Tea, or a Ptisan of Barley, Liquorice and Anise boiled in Water must not be here neglected. By taking these, the Blood usually becomes temperate and attenuated, and the Tumor frequently dispersed.

How a Suppuration is to be managed.

VII. Lastly, if the Surgeon be called in too late, or if the Inflammation prove so violent as not to give way to the preceding Remedies for Dispersions, a Suppuration or Gangrene is generally the Consequence. Therefore the Application of the same maturing Remedies will be here proper, which we proposed in the preceding Chapter for an Inflammation of the Breasts. And when the Matter is sufficiently digested, and the Abscess does not soon break of itself, it will be proper to open it carefully by Incision. The Matter being discharged, the Wound is to be first well cleansed by some digestive Ointment, injecting some strong spirituous Fomentation which resists Putrefaction, and at last healing it with some vulnerary Balsam. But first, to digest the Matter, and mitigate the Pains, it is found extremely serviceable to apply *Emp. de Hyoscyamo, vel Diachyl. cum Gummis*; which are also strongly recommended by Ludovicus in his *Chirurgical Works*, pag. 718. While these Applications are properly used, we must strive to extirpate the Venereal Disease itself. And notwithstanding in many of these Cases, the *Scrotum* happens to be consumed so as to leave the Testicle quite bare; yet the Loss of Substance in the *Scrotum* may be generally restored again, by a proper Treatment with digestive and balsamic Remedies, as I myself have frequently seen.

C H A P. VI.

Of an ERYSIPELAS.

I. **A**N *Erysipelas* is an Inflammation seated in the exterior Part of the Skin An *Erysipelas*, what it is. and *Membrana Adiposa* beneath it, which wanders and spreads sometimes to a very great Extent, being accompanied with great Redness, Heat, and often Pain. Upon pressing the Part afflicted with the Finger, it looks white; but upon removing the Finger it turns red again. This Inflammation has been observed to fix itself ofteneft upon the Arms or Legs; but sometimes it seizes the Head, Neck, Shoulders, and Face^a; often the Nose, and some other Parts. It generally seizes the Patient with a *Horror* or Shivering, after which a great Heat arises, equal to what is usually felt in burning Fevers; and hence it has been distinguished, as well by the Antients^b as Moderns, by the Name of *Ignis Sacer*, or *St. Anthony's Fire*.

II. Any Cause that can produce other Inflammations may also occasion an *Erysipelas*: More especially exposing the Body to sudden Cold, when it is in a Causes of an *Erysipelas*. great Heat or Sweat; an obstructed Perspiration, the drinking too much fermented and spirituous Liquors; a Surfeit, or over-feeding; and lastly, a hot and sharp State of the Blood. From all which, either asunder or together, the Blood may be easily inspissated, the small Vessels contracted, and an Obstruction, with its consequent Inflammation, be brought on.

III. With regard to the Event of this Disorder, it is observed that there is Prognosis. no great Danger, when the Inflammation is but small and properly treated. On the contrary, when the Inflammation is violent, the Habit of the Body ill and infirm, the Diet and Way of Life irregular, or the Part affected exposed to cold, neglected, or improperly treated; it is no Wonder if the Inflammation turns to an ardent Fever, an ill-conditioned Exulceration, Gangrene, or *Sphacelus*. But an *Erysipelas* is more particularly dangerous, when treated with external Applications which are cooling, fat, or oily; and when internal Medicines are taken which heat the Blood, whether Wine, Cordials, Spices, or the like.

IV. In order to cure an *Erysipelas*, the grand Intention is, to dilute the in- Internal Treatment. spissated Blood, and divide it where it stagnates and obstructs. To effect which, there seems to be no better Way than that of giving Plenty of thin watery and warm Drinks, by which, a gentle and lasting Sweat may be excited. For by this means all Viscidities in the Blood will be diluted, any Acrimony will be tempered, and what hesitates or obstructs will be resolved: And lastly, the useless and corrupted Part of the Blood will be ejected by the invisible Pores of the Skin; by which natural Transpiration, the *Erysipelas* will be happily carried off as by an instant Remedy. Heating Medicines of all Kinds, especially the *Tinct. Bezoartica Aq. Epidem.* and other such strong, heating, and spirituous Medicines, are, in my Opinion, wholly foreign and improper for this Cure; because the Inflammation is generally more increased than abated by the

^a An Example of an enormous *Erysipelas* in the Face and Eyelids, which lasted two Months, may be seen described by VERDUG on Bandages, Chap III. and another exulcerated *Erysipelas* in both the Thighs is observed by SCURRETUS, Obs. 92:

^b CELSUS, *varii in locis*.

Use of them. On the contrary, Medicines which are temperating and moderately cooling, are here much more safe and useful: Particularly Preparations from Elder, as *Rob. Sambuc. ʒss. vel Cochlear. j.* diluted in *Aq. Flor. Samb.* In the mean time may be used Tea, Coffee, or a Diet Drink of Physical Herbs. The Patient's Body is to be carefully defended from the external Cold, and to be kept in a gentle and constant Sweat. When the Patient is troubled with great Thirst, he may drink thin Barley Gruel, and for Variety, a little warm Small Beer; for the Main of the Cure generally depends upon moderate Warmth and small Drinks. But if the *Rob. Sambuci* should not be liked by the Patient, some Diaphoretic Powder may be given in its room, or together with it, made of the *Testacea, Antimon. Diaphoret. cum Nitri portiuncula*, in order to excite a gentle Sweat: But then the warm thin Drinks should not be neglected in the mean time. Lastly, the Regulation of the Non-naturals proper here, we suppose to be sufficiently evident from what we have already said of Inflammations in general, *Ch. II. N. XIII, &c.*

External
Treatment.

V. If the Inflammation in an *Erysipelas* should be but slight, it may then be often cured only by external Warmth: But when violent, external Warmth will not be of itself sufficient, without the Application of Medicines. The disordered Part is therefore to be covered with *Rob. Sambuci*, spread on blue Paper or Linen; over which are to be laid warm Cloths, or discutient Bags, as we proposed before in Inflammations. But the Use of the *Rob.* as well as the *Theriaca cum Sale Absinthii* is seldom complied with, because of their Uncleanliness, though very effectual in mitigating Inflammations, as we observed under Inflammations of the Breasts. Upon which Account, the Use of discutient Powders is much more frequent: Among which, the following seems to have the Preference composed *ex Flor. Samb. Glychyrrhiza contrita, Creta præparata, Cerussa item ac Myrrha, aa admixtis cum pauxillo Camphoræ.* This is to be applied to the Part between soft blue Papers or Linen Cloths, over which are to be put little warm Bags. To this we may add the *Pulv. contra Erysipelas Mynsichti*, which is very efficacious, though not much used amongst the Apothecaries. Lastly, we need not say much here of the green internal or middle Bark of Elder, whose eminent discutient Virtue in Inflammations is almost known by every body, and has been this long Time confirmed by constant Experience.

A Caution
concerning
an Erysipe-
las.

VI. Notwithstanding there are some who judge liquid Medicines wholly improper for the Cure of an *Erysipelas*; it must yet be allowed, that *Sp. Vin. Camph.* used warm, either alone, or mixed *cum Croco vel Theriaca* applied warm with coarse Paper or Linen Rags, are of very great Service here. Nor can I pass by a Mixture, which I have frequently experienced in this Case, *ex Aq. Calc. viv. cum Sp. Vin. Camph.* SCULTETUS (*Obs. 94.*) greatly extols the following liquid Remedy against an œdematous *Erysipelas*; he asserts, that he never found any thing answer like it:

℞ *Lixiv. mediocr. ex cinerib. vitis ℥j. Nitri ʒj ℞. Salis commun. ʒj. Aceti vini opt. ʒj. M.*

Universals being premised, this Mixture may be applied to the Part affected by means of double Compresses warmed and retained on with Bandage; by which means it has surprizingly dispersed, in three or four Days time, such large

Tumors

Tumors of this Kind, as have threatened a Gangrene. In the mean time, other liquid Medicines which are over acid, and almost all Obstruents and Astringents, together with fat and oily Things, should be cautiously avoided. For it can scarce be imagined how vastly these stop up the Pores; and by hindering the Blood from throwing off its Feculencies by Transpiration, fling the Patient into imminent Danger.

VII. Bleeding and Purging seem not to be so necessary in an *Erysipelas* as in a *Phlegmon*. For whatever is corrupted of the Juices in an *Erysipelas*, as it lies near the Skin, seems to be much more easily dischargeable by Sweat. But when the Heat is too great, the Pulse too high, and the Blood too abundant; Bleeding in that Case cannot but be judged proper. But to keep the Bowels open, Glysters seem preferable to strong Purges.

Bleeding and Purging when to be used.

VIII. It here frequently happens that an *Erysipelas* comes to Suppuration; from whence usually arise the very worst of untractable and spreading Ulcers. When this is the Case, the Ulcer is always to be carefully cleansed, and dressed with *Ung. Saturnin. vel de Lithargyro vel de Cerussa, una cum Emplastro Saturnino*, to temperate the Acrimony of the Serum. But it is also at the same time proper to take such internal Medicines as will temperate and sweeten the Blood, using sometimes such as discharge sharp Humours by Stool: And lastly, a strict Regimen of Diet must be observed, till the Ulcers are healed again, which is even then a very difficult Matter to effect; especially when seated in the Legs of old cachectical or valetudinary People. See SCULTETUS on this Head, *Obs. 90.*

An Erysipelas sometimes comes to Suppuration.

CHAP. VII.

Of a FURUNCLE, or BOIL.

I. **A** BOIL or Furuncle is a small resisting Tumor, with Inflammation, Redness, and great Pain, arising in the *Membrana adiposa* under the Skin. As there is no Part of the Body free from being the Subject hereof, so the whole is sometimes so miserably infested with them, that the Patient can hardly tell how to stir himself, or on what Part to lie. Not only adults, but also the younger, even new born Infants are obnoxious to this dreadful Disorder, which occasions in them most fatiguing Clamour and Restlessness.

A Boil, what.

II. The Signs proper to a Furuncle we suppose to have been sufficiently evident in what we but now proposed concerning its Nature. And although it be apparent from what has been said, that there is no great Danger in this Disease, when it happens to adults; yet it sometimes happens, when they are very numerous in tender Infants, that they excite not only violent Pains, Restlessness, and Tossings, with Weakness, Convulsions, and Epilepsies, but at length even Death itself follows. Indeed most of the bad Symptoms that attend Boils, as in all other Inflammations, are owing to a thick and viscid Blood. The more glutinous therefore the Patient's Blood is, the more Boils will infest him, and those of worse Consequence.

Signs and Causes.

III. With

Cure.

III. With regard to the Cure, it seems to consist chiefly in restoring the inspissated and stagnated Blood to its former Circulation and free Motion, and that as soon as possible, by proper Remedies. If the Boils are few in Number, they are seldom treated with internal Medicines, the Means generally used being only external Remedies. But when they are very numerous, or return again, it is necessary to use internal purging Medicines, and such as attenuate and cleanse the Blood. So that in adult Patients it seems proper to bleed both by the Lancet and Scarification, with Cupping: At the same time a strict Regimen of Diet should be used, drinking frequently and plentifully of a Decoction of the Woods, and such like Attenuaters of the Blood: The Patient should also entirely abstain from drinking fermented and spirituous Liquors, particularly Wine and its Spirit, and from the too frequent Use of Tobacco.

External
discutient
Remedies.

IV. When the Disorder is recent, external Medicines only will frequently suffice for the whole Cure, if the Patient observe a strict Regimen. For this Purpose the following Mixture is of great Service, made of Honey acidulated with Spirit of Vitriol, till the Mixture has acquired a considerable Sharpness, which is then to anoint the Furuncles. Of no less Virtue is the frequent touching them with mere *Spirit. Vitriol. aut Sulphuris*. And lastly, discutient Plasters are often found very serviceable here, as *Emp. Diachylum simplex, de Meliloto, de Spermate Ceti, vel Diasaponis*.

How they
are to be
brought to
Suppuration.

V. But if the Remedies hitherto proposed prove insufficient to disperse the Tumor, either through some neglect, or any other Cause; the only Means then left is, to bring it to Suppuration. And indeed the Maturation of the peccant Matter is found a very difficult Task in some Cases; insomuch, that the Tumor sometimes remains wonderfully hard and troublesome, even after several Weeks Treatment. Sometimes the stagnating Matter becomes so acrimonious, from its great Inspissation and long Stay, that the Inflammation degenerates into Ulcers, which grow gradually worse and worse, till they end in incurable *Fistule*. In the mean time, to promote and quicken the Suppuration, it is generally found of great Service to apply *Emplastrum ex Melle & Farina confectum, necnon Empl. Diachylum cum Gummi*: And where these are insufficient, to make Use of the maturing Cataplasms, which we before recommended in a *Phlegmon*, Book IV. Chap. II. § XVI. and in Inflammations of the Breasts, Book IV. Chap. IV. § VIII. Though we must observe here, that Plasters are much more commodious for Use in Infants, than Cataplasms. Lastly, when the Furuncle is sufficiently matured, which we may learn from its Softness and yellow Head, we must have Recourse directly to the Scalpel, and having made an Opening, we must discharge whatever corrupted Matter is therein contained. After this is to be applied *Emplast. Diachyl.* and the Ulcer is to be daily cleansed from its Matter, till being freed from all Malignity, it is to be healed with Balsamics.

Furuncles
in Infants
how to be
treated.

VI. When sucking Infants are afflicted with Furuncles, it is proper to give the Mother, or Nurse, some purging Medicine, and to order a strict Regimen and Diet: At the same time the Infant should take some gentle laxative Medicine, with absorbent Powders, *ex Lap. Cancror. conch. Mat. Perlar. Pulv. Anisi & Antimon. &c.* to allay the Acrimony of its Juices. Lastly, those Pustules and Pimples, which arise in the Skin of the Face of some People, are no less than
small

small Furuncles, and therefore ought to be treated like them. The drinking of Whey and the mineral Waters is extremely useful for People who are troubled with these.

C H A P. VIII.

Of the BUBO and PAROTIS.

I. **T**HERE are some Kinds of Tumors which arise with Inflammation, only in certain or particular Parts, to which they are proper, as in the Arms, pits, in the Groins, and under the Ears; and these are called *Parotids*, when under the Ears; in the other Parts, *Bubos*. The Bubo and Parotis, what they are.

II. The Division or Distinction of these Tumors, the *Parotis* and *Bubo*, is generally twofold; into such as are *benign*, or such as are *malignant*. Which Distinction, as it regards the different Method of Cure, we shall explain a little more at large. They are said to be *benign*, (1.) When they arise spontaneously, without any preceding contagious and pestilential Disease, as they frequently do in Infants. (2.) Those are also of this Kind which come after benign Fevers, being a critical Discharge of the Disease. But the *malignant* are such as happen in the Pestilence or Venereal Disease, and are therefore commonly termed *Pestilential* or *Venereal Bubos*. The Kinds of these Tumors.

III. With regard to the *Causes* of benign *Bubos*, we must observe, that they arise from the same internal Causes with all the rest of the Inflammations; that is, from an Inspissation and Obstruction of the Blood: So that they differ from other Inflammations only in the particular Part where they are seated, as in the Groins, under the Arms and Ears, where there are many small Glands and much Fat. Causes of benign Bubos.

IV. Nor is the *Diagnosis* of these Tumors difficult, if we do but consider whether there has preceded any Pestilential or Venereal Cause, to occasion that Tumor and Inflammation in those Parts. But great Care must be taken to distinguish a *Rupture* from a *Bubo* in the Groin; for by an imprudent Incision in such a Case, the Life of the Patient may be endangered. Diagnosis.

V. When these Tumors are benign, their Consequences are usually milder and less dangerous: Because they may be generally either dispersed or suppurated. But a speedy Dispersion or Suppuration of these Tumors is found to be more difficult and of pernicious Consequences in Patients of an ill Habit: Inasmuch, that a Suppuration of them sometimes produces *Fistulae*, which are very difficult to cure. Lastly, the *Parotides* are the most difficult to cure, the Inguinal *Bubos* not so difficult, and the Axillary *Bubos* are the easiest of all, as they generally tend to Suppuration. Prognosis.

VI. In *Bubos*, which are unaccompanied with any other Disease, especially those of Infants, the frequent taking of some cathartic Medicine, with an Addition of *Merc. Dulc.* is found to be of great Service; as it draws off the glutinous and inspissated Blood from the Part affected, and at the same time thins the whole. Other Medicines, which attenuate the Blood, should be also used, such as we before proposed for Furuncles. But if there should be any thing of a Fever, Internal Treatment.

the Advice of some prudent Physician ought to be called in, who will take care of the Fever, and treat it with proper Medicines.

External
Resolution or
Dispersion.

VII. When the Inflammation is so gentle as to give Hopes of Dispersion, it may be proper to apply discutient Plasters externally; as *Emp. Diachyl. simplex, de Spermate Ceti, de Galbano, Diasaponis, vel de Ranis cum Mercurio, &c.* since by these Means both *Parotides* and *Bubos* have been frequently dispersed.

Suppuration
how pro-
moted.

VIII. But when the Inflammation proves more violent, the Pains more intense, and the discutient Plasters avail nothing, we must then strive to bring it to Suppuration, by the Application of *Empl. Diachylon cum Gummis*, which is effectual here. If violent Pains also afflict the Patient, the frequent Application of digesting Cataplasms warm to the Part, will generally not only mitigate the Pain, but also greatly promote a Dispersion, or else a Digestion and Maturation. Cataplasms of this Kind may be made of the Crum of Bread and Milk, boiled to a proper Consistence, mixing afterwards a little Butter and Saffron therewith: Or Meal with Honey and fresh Butter, reduced to the Consistence of a Cataplasm over the Fire, may be frequently applied warm, and a little Quantity of *Theriaca* may be added to it with Advantage.

The Treat-
ment after
Suppura-
tions.

IX. Cataplasms like the former, or such as we recommended in a *Phlegmon*, and Inflammation of the Breasts, should be thus frequently applied warm to the Tumor, till the stagnating Matter appears to be suppurated. As soon as we find this, we must directly make an Opening, either with the Scalpel or Caustic. See before, *Chap. III. § 10.* But great Care must be taken in the Opening, not to wound any of the large Veins and Arteries which are near the Abscess, as the Jugulars and Carotides in the Neck, the Axillaries under the Arm, and the Crurals in the Groin: For a fatal Hæmorrhage might by that means be brought on. As soon as the Abscess is opened, the Remainder of the Treatment is to be the same with what we have so frequently advised in other Abscesses. More especially it is of Service here to apply *Empl. Diachyl.* as it readily disperses or softens any remaining Hardness that may adhere to the Mouth of the Ulcer.

CHAP. IX.

Of PESTILENTIAL BUBOS, where also of CARBUNCLES.

The Kinds
of Pestilen-
tial Tumors.

I. **P**ESTILENTIAL Tumors are easily distinguished by Physicians into *Bubos* and *Carbuncles*. And here, by the Name of *Bubo* they comprehend all Tumors, not only such as arise under the Ears, Arms, and in the Groins, but also in the Neck, Breast, Arms, Legs, and other fleshy Parts of the Body, which swell and inflame in pestilential Fevers; whilst Nature endeavours to drive out the pestiferous Matter, which lay concealed in the Body.

Diagnosis.

II. Pestilential *Bubos* are distinguishable from other Tumors, by their happening at a Time, and in Conjunction with the Plague, and from their being accompanied in the Patient with the Symptoms proper to that Distemper. For it must be here observed, agreeable to the Testimonies of the best modern Writers, who have lived in time of the Plague*, that People who are seized and in-

* As by God's Providence I never saw the Plague, I cannot write any thing of it on my own Experience; yet I was unwilling to be silent on so considerable a Disorder, and not mention what has been observed and confirmed by the best modern Physicians. I therefore carefully perused such
fected

fect by the Distemper, if they do not die quickly, are shortly to expect these Tumors in several Parts of their Bodies. They appear sometimes sooner, at other times later. In some the Tumors appear before they are taken sick by, or ever perceive the pestilential Venom: In others, the Tumors are two, three, and four Days, after the Appearance of the Distemper, before they come out; but they are seldom observed to come out later. These Tumors or *Bubos* are sometimes joined with Carbuncles: But though the *Bubos* frequently arise without the Carbuncles, yet the Carbuncles seldom arise without Tumors.

III. It has been this long time observed, particularly in the later Plagues, *Prognosis.* that such Patients as had Tumors come out, without any very bad Symptoms, had them mature speedily, and were the soonest free from the Distemper. Hence it is not without Reason affirmed, by some of the more learned and modern Physicians, that *almost the whole Business of curing the Plague* consisted in carefully promoting the Eruption of *Bubos* and Tumors; nor that any one could be preserved but by means of those Tumors: While those who rightly cure these *Bubos*, do also at the same time rightly cure the Pestilence. The Case being thus, resolving, discutient, and repelling Medicines, together with Bleeding and Purging, are so far from proper in the Cure of the Plague, that by throwing the Venom again into the Blood, they destroy the poor Patient. Therefore the chief Business of the Physician or Surgeon here, is, carefully to assist Nature in her Endeavours to throw out the Tumors as soon as possible, and to bring them speedily to Suppuration and Maturity.

IV. That this may be effected the more readily, it seems to be much the best *General Treatment.* Way to order the Patient to keep House upon the first Appearance of the Tumors, or rather to keep in a warm Bed, to be more secure from the Air. For by this Means the Patient rests more securely from the external contagious Air, and by the Use of proper external and internal Medicines, the *Bubos* may be more regularly expelled and brought to Suppuration.

V. Externally it is very serviceable to rub the tumified Part pretty strongly *External Treatment.* with the Hands or Cloths, and what is still preferable, to apply external maturative and emollient Medicines, whereby they will come out the sooner. And we shall also here find great Benefit from the Use of a Cataplasm made *ex Fermento Panis calido, vel solo, vel & cum Sale atque Sinapi contrito.* By means of this, the tense Parts are relaxed and stimulated; whereby the pestilential Matter may be received and cast off from the Blood, and come afterwards to Suppuration. Of the like Virtue are not only the Cataplasms, which we before recommended for suppurating other Tumors, in *Chap. II. § 16.* and *Chap. IV. § 8.* but more particularly those which are made *ex Cepis sub cineribus tostis, atque cum Theriaca & Butyro subactis, vel etiam ex Pane Triticeo sive Semilagineo interiori, cum Lacte atque Croco probe concocto.* But there are some Surgeons who prefer emollient Plasters to Cataplasms: Because the frequent Renewal of the Cataplasms requires the Body to be often uncovered, whereby the Perspiration is impeded and disturbed. The emollient Plasters used instead of the Cataplasms, are the *Empl. Diachylum simplex vel compositum*, or such as follow. The excellent

as had observed the last of this Distemper in *Austria, Bavaria, Silesia, Prussia, Poland, Holsatia, Denmark, and Marseilles*, endeavouring to reduce what they had observed with regard to the Symptoms, &c. to a Sort of *Compendium*, that my Reader might rely on them afterwards.

BARBET, in his Treatise *De Peste*, particularly recommends the following Plaster, which seems very efficacious:

℞. Empl. Diackyl. c. Gummis, de Mucilaginis ana ℥℥. Semin. Sinapi pulverisati ℥ij. Unguenti Basilici ℥iv. m. f. Empl.

A Plaster of this is to be applied to the tumified Part, after it has been first well rubbed, and to be renewed every or every other Day. The celebrated Dr. HODGES, in his Description of the great Plague in London, An. 1665, greatly recommends the following:

℞. Empl. Oxycroc. ℥ij. Gum. Galban. colat. Carana ana ℥j. Picis Naval. ℥ij. cum Ol. Chamæmel. liquato f. Empl.

This may be used like the former. Nor is the Use of that Plaster to be despised here, which is made of Honey, Meal, and the Yolks of Eggs. But the Blistering with *Cantharides* and dry Cupping, used by the Antients to forward Suppuration, are wholly rejected by the most expert of the modern Physicians in the Cure of the Plague ^a.

A particular
Observation
of BEIN-
TEM's.

VI. But what the celebrated German Physician, BEINTEM, observes, is not a little surprising and worthy of our Consideration. He asserts, in the last Book of his *Latin* Treatise on the Plague, that pestilential *Bubos* were frequently dispersed and cured without any Danger, merely by the Application of warm Ashes. Though there is scarce any body besides him, that advises to discuss or cure pestilential *Bubos*, without bringing them to Suppuration, or that ever found such a Method safe and successful: But in the Judgment of BEINTEM, the pestilential Venom was not drove into the Blood again in the Discussion, but was rather attracted and carried off by the Ashes.

Internal
Method of
Cure.

VII. To these external Applications it will be proper to join internal Medicines; by the Help of which, the Venom lurking in the Body may be expelled in a gentle Sweat. But such sudorific Medicines, as are very strong and heating, have been always found dangerous and pernicious by the modern Physicians. Warm and watery Drinks have generally been found more safe and useful in this Case, as being particularly adapted to temperate the Blood, and excite a gentle Sweat. Among these Drinks, we may reckon common Tea, with the Addition of a little Saffron; or Infusions of other alexipharmic Herbs, as *Salv. Scordium, Ruta, Millefol. Betonica, &c.* or else the plentiful drinking of some warm Ptisan, made with or without *Rad. Scorzoner.* taken till it excite a constant but very gentle Sweat. And as the more vehement Sort of Sudorifics are improper, so the drinking of cold Liquors are generally found equally pernicious: For they not only wonderfully suppress the gentle Sweat, but also strike in the *Bubos*, in whose Eruption a happy Cure chiefly consists. The Air of the Patient's Chamber should be temperate, neither too hot nor too cold: His Bed should also be the same, and made as convenient as possible. If the Patient should find himself very weak, but without any great Heat, it will not be improper to give a few Drops of *Elix. Proprietatis vel Mixture simplicis, Tin&ur. Bezoart. Essent. Myrrhæ, Ess. Scordii, &c.* about thirty or forty Drops for a Dose two or three Times a Day, in some warm Liquor: Or, it may be

^a Yet SCHREIBER, a very modern Writer on the Plague, declares, that in *Russia* Blisters were applied to pestilential *Bubos* with great Success, laying on afterwards the emollient Cataplasms just now recommended. See his *Obs. on the Plague*, p. 23.

requisite to give some proper bezoartic Powder^a. On the other Hand, in warm Constitutions, where the Heat is too violent, it will be proper to give *Nitrum depuratum cum Lapidibus Cancrorum Conchisque præparatis*: Also temperate Acids, as *Succ. Malor. Citreor. Ribesior. Granator. &c. vel Syr. ejusd. cum Aqua Borag. Bugloss.* or any thing that is temperately cooling, to which the Patient has a Fancy; and if the Heat be still more vehement, it may be necessary to drop in *Spiritus Vitrioli Dulcis aliquot guttulas*.

VIII. The Medicines hitherto proposed are all of them allowed to be the most proper to be often taken, and sufficiently powerful to drive out any pestilential Venom that may lurk in the Blood, agreeable to the Writing and Practice of the most expert Physicians, who have lately wrote in *Poland, Prussia, Denmark, Austria, Hungary, Ratisbon, &c.* The Use of these should therefore be continued 'till the Tumors are either dispersed (which they allow to sometimes happen) or suppurated and brought to Maturation, which is the common and constant Practice. In some Cases the Tumor turns suddenly to Suppuration; and in others it remains for some Weeks without being any thing softer. When this is the Case, it is necessary to continue the Use of the forementioned Remedies, 'till the Tumor either breaks of itself, or is fit to be opened like other Abscesses by Incision with the Scalpel, that the pestilential Matter may be discharged and prevented from returning into the Blood.

How the Abscess is to be opened.

IX. When the Abscess is thus opened, we must proceed directly to the cleansing of it; and after the Cleansing, the Wound is to be healed with some vulnerary Balsam, as we before proposed. To deterge and cleanse, the best that can be used here, is *Ung. Digest. cum Theriac. Balf. Sulph. Terebinth. portiuncula permixtum*. At each Dressing the Matter is to be gently discharged from the Ulcer, and, when cleansed, it is to be treated with the forementioned Ointment; but without Tents, unless its Opening should be very narrow: Then applying some proper Plaster, it may be bound up again as before. The best Plasters for this Purpose are, the *Emp. Diachyl.* or that made *ex Melle & Farina*; the Use of which may be continued 'till it is perfectly healed up.

Treatment after Apertion.

X. With regard to the Time of opening the Abscess by Incision, Physicians are not agreed upon it: For there are many, especially of the modern Authors, who have wrote on the Plague, that forbid the Opening of Pestilential Bubos till they are perfectly ripe and soft. Besides, these Bubos, agreeable to the Observation of many, do generally suppurate and break of themselves; insomuch, that, in the Opinion of these Gentlemen, an Opening made by Incision too soon, may greatly endanger the bringing on ill-conditioned *Fistulae*, a Stiffness in the Limb, and even a Gangrene^b. Others, on the contrary, will have it, that an Opening made by Incision in the very Beginning of the Bubo, is not only without Danger, but even directly suited to preserve the Patient, and recovering him the sooner from his dreadful Disease. *Vid. EPHEM. Nat. Curios. Cent. VII. Obs. 69. pag. 170.*

The Incision is not to be made too soon.

^a Here SCHREIBER recommends the following Powder to be given every three Hours, having in the first Place vomited the Patient with *Ipecac.* *R. Antimon. Diaphor. Nitrat. Gr. xv. Merc. dul. Gr. i. Camphoræ Gr. ij. M. F. P. in Sero Lactis vel Hordei decoct. tepid. sumendus, superbibendo ejusdem, &c.*

^b The Author of a French Treatise, entitled, *Observations sur la Saignée de Pied*; observes, that in the Plague of *Marseilles*, too early an Incision of Bubos was generally unsuccessful.

XI. Notwithstanding several of the antient Physicians have contended for a speedy and entire Extirpation of Pestilential *Bubos* by the Knife, in order to discharge the contagious Venom; yet the Moderns do not without Reason dissent from their Opinion. For such a Method of Cure is not only found to be too harsh, but also of very dangerous Consequence in many Parts of the Body. In like Manner, all Emetics, Cathartics, Bleeding, and hot cordial Medicines are, by the unanimous Consent of the Moderns, condemned as things very pernicious in the Pestilence; notwithstanding they were held in so great Esteem by the Antients. Such were the Bezoardic Tinctures, hot Essential Oils, and volatile Antipestilential Spirits, together with the *Theriaca* and *Mithridate*.

CH A P. X. Of the PRESERVATIVES particularly necessary to defend and preserve the

Physician or Surgeon from PESTILENTIAL CONTAGION.

Preservatives hitherto uncertain.

I. **H**ITHERTO we have been treating of Pestilential *Bubos*. But before we proceed to Carbuncles and *Anthracas*, it will be proper to say something of the means that may be used by the Surgeon to defend himself from the pestilential Contagion, that he escape free in visiting the infected. But before we take upon us this Task, it will be first proper to inform our Reader that we believe there has not ever been yet found a certain Preservative for this Purpose: So far from it, that many of the Remedies purposely contrived and recommended, are wholly useless and improper; even some of them are very dangerous when lodged in imprudent Hands, and are therefore to be cautiously avoided.

Which of these Methods are to be avoided.

II. There are many, who assert frequent Purging to be wonderfully adapted to carry the pestilential Contagion off the Body, and prevent it from getting into the Blood. There are Others, who lay great Strefs upon sudorific Medicines, Scarifications, and frequent Bleeding, as of great Service to defend the Body from the pestilential *Virus*. Whereas all of them, unless the Body is habituated to them, are great Destroyers of the Strength; and by that means, rather than defend, they make the Body more obnoxious to, and susceptible of, the contagious Venom. Others again believe nothing more effectual as a Preservative against the Contagion, than the frequent and plentiful drinking of certain hot Spirits or Waters, dignified commonly with the Title of Epidemic or Antipestilential. But we shall be ready to judge the use of these also to be equally foreign, and altogether improper, if we do but consider what violent Heats the plentiful use of such spirituous Liquors will excite in the Blood, beyond what it should naturally suffer, and by that means it may be rendered more liable to fall into a Pestilential Fever: Unless the Person has been accustomed to the use of such Liquors before, or else used them with great Moderation. The same Judgment we must always pass upon the common Spirit of Wine, *Aqua Vitæ*, and the alexipharmic Electuaries and Oils, with all other heating Medicines, since their Nature and Effects are directly the same. Lastly, there are still others who confide in things hung about the Neck, as Arsenic, Mercury, Sand, Camphire, and

and *Rad. Colchici*; or else the keeping open large Issues, from all which they expect a secure Defence from the Plague. When at the same time there can be found little or no Virtue in either, or all of them, to resist the pestilential *Virus*. It has been observed by antient Writers, that Persons afflicted with Ulcers of any standing, escaped the Infection of the Plague: Which Observation is confirmed by SCHREIBER amongst the Moderns. In that Case those Ulcers should by no means be healed. On which account some Physicians have advised Issues as Preservatives; but to no Purpose.

III. The best and readiest Defence against the Plague seems in general to consist in this, that such as are able should remove out of the pestilential or infected Air into some healthy Part of the Country; or, wherever they are, they should keep from the Company of such as are already infected, and not meddle with their Cloths, Bedding, Meat, Drink, or Vessels; and above all, if possible, not to make themselves over afraid of the Disease: But let them always keep a cheerful and confident Mind, with a proper Diet. But for the Physician and Surgeon, whose Business is to relieve the Sick, and for that Purpose must enter dangerous Places, it is best for them to keep up a courageous Mind, and not be anxiously afraid of Diseases, nor even the Plague. For it is to be hoped that those, who risque themselves with these Precautions to succour pestilential Patients, will be preserved in Safety by a Divine Providence. SCHREIBER recommends, as a safe Preservative, the taking every Evening, *Merc. Dulcis* & *Campbor.* of each i Gr.

The best
Defence
against the
Plague:

IV. But besides, there are several human Cautions and Observations necessary to be regarded by the Physician and Surgeon. The chief of these are, that *they should never go fasting to visit a Patient sick of any contagious Disease, and much more of the Plague*: But they should always eat something and drink some strong Liquor before-hand, in order to defend themselves from the pestilential Contagion and infected Air. Some Physicians therefore always *eat Bread and Butter, and drink a Draught of Spanish or Wormwood Wine*, or some other strong Wine, before they offer to set a Foot in the Patient's House. By this Method, the celebrated Dr. HODGES writes, that he preserved himself from Infection in the violent Plague at *London*, chiefly by drinking *Spanish Wine*. DIEMERBROEK tells us, that by the Benefit of *Rhenish Wine* he escaped the Infection in the Plague at *Neuburg*. Others prepare themselves in a Morning, *by eating a slice of Bread soaked in good Vinegar*, either simple, or wherein Rue has been infused. SYLVIVS has contrived an acidulated Medicine purposely for this Use, which the Apothecaries call *Aqua Prophylactica Sylvii*; and is to be drank to the Quantity of one or two Spoonfuls in a Morning, either alone or with a slice of Bread, by such Surgeons as are going to visit pestilential Patients. Others again assert it to be confirmed by Experience, that some good Broth or Suppings, especially of Chocolate, are of great Service in keeping off the pestilential Venom. CARDILUC mentions his eating a Citron every Morning, *Lib. de Peste, p. m. 70.*—Upon the whole it is my Opinion, that in hot Constitutions, Acids, and Coolers, are the best Preservatives; in cold, the Reverse, at least moderate Cordials.

(1.) before
we visit the
Patient.

V. Being come to the Patient's Apartment, great Care must be always taken *that we neither eat nor drink there, nor even swallow our Spittle*. For there is no small Danger in that Case, of swallowing the volatile pestilential Exhalation

(2.) while
we are with
the infected
Patient.

or

or Effluvia, by which means our internal *Viscera* and Blood would be infected. For which Reason we cannot approve of the Custom of some who are continually chewing and swallowing Myrrh, Cinnamon, Angelica, Zedoary, or the like, all the Time they are in an infected Place. For as such Things excite a plentiful Discharge of *Saliva* into the Mouth, it is hardly possible but some of the infectious Effluvia will be intangled therein, and so go down into the Stomach and get into the Blood. But the chewing of such Aromatics may be very proper at home, as they are in their own Nature wholesom; the Use of them in the former Case being improper only as to Time and Place. We ought also to be particularly careful *not to stay longer in the infected Place or Apartment of the Patient than our Business really requires*: For there is great Danger that the Strength of our Constitution, however considerable, may be overcome by the too great Quantity and Force of the pestilential *Virus*: Whereas we might have easily resisted and sustained a small Quantity of the same infectious Effluvia.

(3.) when
we are re-
turned home
from the
Patient.

VI. After we are returned home from the Patient, it is much the safest way to wash our Hands and Mouth well with Vinegar mixed with Water: For if there be any thing prevailing against the pestilential Venom, Vinegar seems to be the chief. The Cloths are to be changed for others, and exposed to the free Air, and to be afterwards perfumed. Then Suppings of Coffee, or Tea of *Scordium*, Sage, and the other alexipharmic Herbs should be plentifully used. For these excite a gentle Sweat, and so drive out such contagious Particles as might happen to be mixed with the Blood, keeping it free and temperate.

A proper
Diet is to be
strictly ob-
served.

VII. As an accurate Regimen of the Diet is always healthful in other Cases, so also in Places where the Pestilence rages it is found to be altogether necessary. Therefore so much Aliment, solid and fluid, is always to be taken at one Time, as is requisite to keep up the Strength of the Body, and may be conveniently and perfectly digested. But Care must be taken not to burthen Nature therewith. For it can scarce be said how vastly Intemperance weakens the Stomach and Body, and renders it liable to contagious Distempers; from the Crudities and undigested or corrupt Matter, which is by that means lodged in the Blood. Modern Physicians observe, that there is no Occasion for choosing a particular *Diet*: Ordinary or common Food may be taken as usual, if it be not against Custom and Temperance. In Broths and Suppings should be always mixed, whenever it can be done conveniently, some Vinegar, or the expressed Juice of Lemons or Citrons, a few Capers, or some other subacid Thing of the like Kind. For the Use of every thing gently acid is usually very safe and beneficial in the Pestilence: So that a moderate Plenty of all Sorts of Pickles are in this Case found very salutary*. There is no need of any great Change in the common and daily Drinks: But this I must observe, that those consult best for their Stomach and the Strength of their Constitution, who drink *Spanish*, *Rhenish*, or any other good Wines at their Meals. If any one be accustomed to *Tobacco*, I would advise him to keep up the Habit: But I would not persuade such as dislike it, or are of a hot Constitution, to take Tobacco against their natural

* The Physicians of *Marfeilles* were of Opinion, that an Acid was the Cause of pestilential Disorders; because *DEIDIER* in the Dissection of Subjects who had died of the Plague, had found the Hearts exceeding large, and the Blood in them coagulated. But this to me is no Proof at all.

Appetite as a Preservative from the Pestilence. For I think it has been this long Time observed that Lovers of Tobacco have been equally as often and easily seized by the Plague as others who do not use it. Lastly, where Persons have been before accustomed to the Use of Stomachics, Sudorifics, Vomiting, Purg- ing, Scarification, Bleeding, and the like, at certain Times or Seasons, they must be cautious not to break off too suddenly from such Habits, but rather to continue them at their stated Times^a. But for Coition, as it greatly weakens and even ruins the Constitution at such an unfavourable Time, especially if the Habit of the Body be naturally infirm, that should be equally avoided with the Pestilence itself.

VIII. In the last Place, in order to keep off or correct the pestilential Efflu- via, it will not be improper frequently to hold a Sponge to the Nose which has been first wetted with simple Vinegar, or that wherein Rue or Lavender has been infused. The Chamber should also be fumigated with Juniper Chips, Gun- powder and Brimstone, or with Vinegar, sprinkled upon a red hot Tile or Iron, in order to expel and correct the pestilential Air.

External
Helps a-
gainst the
Plague.

CHAP. XI.

Of CARBUNCLES, or ANTHRACES.

I. **A** CARBUNCLE is said to be an Inflammation which arises in Time of the Plague with a Vesicle or Blister, almost like those produced by burning, or the Application of Cantharides. But this sort of Inflammation generally terminates in a *Sphacelus*, and putrifies the subjacent Parts down to the Bone, they becoming as black as a Coal, insensible and dead. And this seems to be the Reason why they are by the *Latins* termed *Carbunculi*, and by the *Greeks* *Anthraces*^b.

A Carbuncle
what.

II. A Carbuncle always breaks out very speedily, even in the space of an Hour or two, attended with Heat and Pain. Upon opening it, there is dis- charged a darkish and sometimes limpid or watery *Sanies*: Within, the Flesh is of a black Colour, a *Sphacelus* having then seized the Parts, which spreads more and more by Degrees: But the putrid Flesh in those who recover, suppurates and parts from the sound. The size of these pestilential Blisters is various, more or less, as is also their number in the same Patient. For there is no Part of the Body which they do not infest: And they generally appear in company with *Bubos*; indeed they are seldom or never to be observed without *Bubos*.

The Nature
of Carbur-
cles.

III. The immediate and usual Cause of Carbuncles is doubtless a violent In- flammation, excited in the Blood by the pestilential Venom. The Inflammation is speedily and suddenly followed by a Corruption and Sphacelation of the Parts. But the Parts and Juices do not suppurate into Matter, as is usual in other Tu- mors; but whatever is internally corrupted separates and intirely falls off. For the inflamed Parts suppurate at the Margin or Extremity of the Inflammation; so that if the Patient does not dye suddenly, the sphacelated Parts which have

Causes.

^a This CELSUS very judiciously recommends, *Lib. I. Cap. 10. de Pestilentia*.

^b As to the Term. Carbuncle, Vide CELSUS, *Lib. V. Cap. 28. de Carbunculo. Lib. VI. Cap. 6. § 10. & Lib. VI. Cap. 18. § 5.*

the Carbuncle are by that means separated from the sound and living Parts, and are by degrees wholly cast off.

Progress.

IV. Experience witnesses that the Events of a Carbuncle are very doubtful, and much worse than those of *Bubos*: Especially if the Eruptions turn directly either livid or black. But when the Pustules are red at first, and then gradually turn to a Citron Colour, the Danger is much less. Those Carbuncles which arise in the Face, Neck, Breast, or in the Arm-pits, are observed to be of the worst Kind; for they generally kill the Patient.

Internal Treatment.

V. As for the internal Treatment of Carbuncles, whether by Diet or Medicines, the very same is to be observed in this Case, with what we recommended in *Chap. IX. § 7.* of pestilential *Bubos*. For the chief of the Cure consists in keeping the Patient in a gentle and constant breathing Sweat. But SCHREIBER, in his *Observ. on Pestilential Carbuncles*, considering them as a Species of *Sphacelus*, strongly recommends the *Peruvian Bark*, as given in Fevers.

External Treatment.

VI. The chief Design of the external Treatment is, to quicken, as much as possible, the Separation of the Parts sphacelated with the Carbuncle from the sound. Therefore some of the modern Physicians use only Scarification in this Case, with very good Success: For by cutting away frequently the corrupted Parts quite to the sound, they let out the acrimonious and pestilential Matter with the corrupted Blood^a. Others only open the Eruptions with a Pair of Scissors, and having discharged the Matter, they often wash the Carbuncle with *Sp. Vin. Camph.* or *Sp. Vin.* wherein has been digested a little *Theriaca*. They afterwards apply a maturing Cataplasm, like the following.

℞. *Mellis cochlearia* iv. *Fermenti panis cochlearia* iij. *Vitell. Ovor.* N^o ij. *Sapon.* ℥ ss. *Quæ probe commisceantur, calidaque superimponantur.* Vel,
℞. *Farinæ Siligin. vel Tritic.* ℥ iij. *Aceti* ℥ ss. *quæ ex Aqua vel Lacte ebutyrato decocta atque in Cataplasma conversa cum Mellis* ℥ j. *Crocique contriti* ℥ j. *misceantur, calidaque sæpissime supradentur.*

Whether the Carbuncle should be cut out.

VII. The Application of the forementioned Cataplasms is to be continued till the Carbuncle separates or casts off from the sound Parts. For it is better to dissolve the Carbuncle gradually from the adjacent sound Parts, than to cut it out all at once. Nor are Instances wanting where the Patient has been killed by an unseasonable and entire Extirpation of the Flesh and Carbuncle: For we learn by Observation, that most sharp Pains and other dangerous Symptoms usually follow such an over-powerful Remedy. But where the greatest Part of the Carbuncle is already separated from the live Flesh, the remainder may be safely divided by the Scalpel.

VIII. But if an ill-conditioned luxuriant Flesh grow internally either of itself, or from the Extirpation being made too soon, it is upon all Accounts necessary to entirely consume it by the Application of *Ung. Ægyptiacum vel fuscum Wurtzii*, or else by the Ointment following:

℞. *Mellis cochlearia* ij. *Vitell. Ovor.* N^o ij. *Alum. usti pulv.* *Gentianæ Aristolochiæ ana* ℥ j. *m. f. Unguentum.*

^a SCHREIBER advises scarifying, as very advantageous, *Lib. IX. p. 23.*

IX. If the Inflammation inclines the adjacent Parts to a Gangrene, which is not unusual, it will be proper to use the following Ointment: How to remove a supervening Gangrene.

R. $\odot$ *Absinth.* $\mathfrak{z}$ $\mathfrak{ss}$. *Herb. Scord. Flor. Sambuc. Chamæmel. ana* Mj. *Aq. simpl.* $\mathfrak{H}$ ij. $\mathfrak{ss}$.

When these have been well boiled and strained, mix of the best *Sp. Vin. Campb.* $\mathfrak{z}$ vj. *Theriac.* $\mathfrak{z}$ ij. then let it be applied very often and hot to the Parts, by means of Linen Rags folded together, or Compresses, till the Violence of the Inflammation abates.

X. But when these very bad Symptoms are absent, after a Separation of the Carbuncle from the live Parts, it will be proper to cleanse the Ulcer with *Ung. Fus. WURTZII*, or the digestive Ointment before described in Chap. IX. § V. *Of pestilential Bubos.* And this should be done perfectly, lest any of the pestilential Venom should remain behind; and excite the former Symptoms again. Therefore the Deterision of the Ulcer ought to be continued till there remains nothing of these pestilential Symptoms; and when that is effected, the Wound may be healed like other Abscesses: More especially, it should be dressed with Lint dipped in *Essent. Myrrhæ & Aloës*, applying over an *Emplast. de Lithargyre*, or the like, till the Ulcer is perfectly cured. What is to be done after a Separation of the Carbuncle.

XI. There are many of the more celebrated Physicians, who, with CELSUS, allow nothing to be more effectual in extirpating and curing Carbuncles, than the actual Caution, or a red-hot Iron. With this they order the dead Parts to be burnt till the Flesh becomes in every Part sensible of the Pain; by which means the e seems to be no Reliques left of the Carbuncle. This Method was observed by Dr. HODGES to be the readiest Way of Cure for Carbuncles in the great Plague at London. But there are abundance of Circumstances which prohibit the forementioned Method of Cure by the Caution from being used in many Cases; as the Dread of the Patient, the Tenderness and Consequence of the Parts, &c. that rather persuade such Methods of Treatment as we have before proposed; which are therefore to be made use of here. SCULTETUS says, that a dying Carbuncle will start out afresh (which is of dangerous Consequence) on holding a red-hot Iron at a Distance. Whether Cautiones are to be applied.

XII. The celebrated SYLVIVS thought *Butyrum Antimonii* an efficacious Remedy to extirpate Carbuncles, if the circumjacent Parts were anointed with it. For, in the Opinion of SYLVIVS, it not only prevents the Disorder from spreading, but it also readily makes an Eschar that divides the sound Parts from those which are corrupted, and at length wholly separates them. But such of the modern Physicians as have wrote professedly on the Plague at Vienna and Ratisbon, do by no means agree with him. For if we may believe these, the *Butyrum Antimonii* is so far from being serviceable in Carbuncles, that it rather excites the worst of Symptoms, and often brings sudden Death. In the mean time, we find BOTTICHERUS assenting to the Opinion of SYLVIVS, in his *Loimegraphia Hafniensis*: Where he frequently praises and recommends the *Butyrum Antimonii* as an excellent Remedy for this Purpose. And SCHREIBER tell us, that many Surgeons applied the *Lapis Infernalis* to the Lips of the Carbuncle; and that, in consequence thereof, it separated with great Ease, by means of a digestive Ointment, and an emollient Cataplasma. But whichever be the Case, the Method by using *Butyrum Antimonii* is, in my Opinion, more safe and preferable to the Way

of Cure by the Cautery. Lastly, whichever of these Methods of Cure practised, the Business afterwards will be always first to perfectly cleanse the Wound, and then to heal it up.

C H A P. XII.

Of VENEREAL BUBOS.

What a Venereal Bubo is,

I. **A** VENEREAL Bubo is a Tumor with Pain and Inflammation arising in the Groins or Arm-pits, after Contact with an impure Woman. *Bubos* of this Kind are distinguished into two Sorts. (1.) Such as arise without any other Symptoms of the Venereal Disease: Or, (2.) Those which are accompanied with the other usual Attendants of the Disease; as a *Gonorrhœa*, and Venereal Ulcers, usually termed *Shancres*.

Symptoms.

II. *Bubos* of this Kind usually arise, as we before observed, after Contact with an impure Woman, who is afflicted with the Venereal Disease: After which, they arise sometimes sooner, and sometimes later; that is, within a few Days after Infection. The Tumor then arises in the Patient with Hardness, Redness, and Pain, either in one or both the Groins, and sometimes in the Arm-pits. So that if we regard the Colour of Venereal *Bubos*, there is little or no Difference between them and the Benign Sort. See *Chap. VIII.* foregoing. Care must therefore be always taken, that we do not mistake one for the other: For such as take Benign *Bubos* for Venereal ones, generally treat the Patient with an unjust Suspicion, Contempt, and a harsh Method of Cure. On the other hand, when Venereal *Bubos* are mistaken for Benign ones, there is Danger lest the Patient, being treated in the mild Method suited to Benign *Bubos*, should be unhappily brought into a confirmed *Lues*.

Diagnosis.

III. The most certain Signs that these *Bubos* are Venereal, are the Patient's having had to do with unclean Women, and from their being, or having been, accompanied with a *Gonorrhœa*, *Shancres*, or other Symptoms of the Venereal Disease. When any of these are present, they give strong Reason to suppose the Bubo to be Venereal: But when they are absent, they take off, or at least greatly diminish, the Probability of the *Bubos* being virulent. As soon as it appears from the Patient's Confession, or other Circumstances, that the *Bubos* are Venereal, we must proceed accordingly with Expedition to a proper Method of Cure. Though this Disorder generally admits a pretty easy Cure at the Beginning, yet, when it has gained Ground, either from Delay, improper Treatment, or an irregular Course of Life; a Cure becomes then extremely difficult, and it frequently turns into the *Lues* itself.

Whether a Dispersion be safe.

IV. With regard to the Cure, there are many Physicians who hold a Dispersion of Venereal *Bubos* equally improper with the Pestilential: Because, by that Method, the venereal Venom returns, contrary to the Design of Nature, into the small Vessels; and, by infecting the Blood, brings on a Pox. They therefore judge it necessary to abstain entirely from Bleeding and Purging, and to forward the Tumor to Suppuration as fast as possible. But with Submission to these Authors, I cannot be of their Opinion. For the Cure by Suppuration is not

only

only slow and tedious, but also attended with many Inconveniencies: Whereas I have frequently experienced, with the greatest Safety, much better Effects from the taking of Cathartic and Mercurial Medicines, together with a Decoction of the Woods, and other such Purifiers of the Blood. For by this means the Virulency may be discharged from the Body much sooner than by Suppuration; and the Tumors may be safely dispersed without Danger of a *Lues*, or other bad Symptoms.

V. Whether the Patient have a *Gonorrhœa* or not, the best Way is to purge him with frequent and large Doses of *Merc. Dulc.* as is usual in carrying off *Gonorrhœas*. For in curing a *Gonorrhœa*, you also cure *Bubos* generally at the same Time, and by the same Means. Nor can *Bubos*, be happily cured till the Body is first quite freed from the venereal Venom. When there is a considerable Inflammation, especially in young plethoric Habits of Body, it seems to be altogether necessary to bleed, and give mercurial Purges afterwards, with a Decoction of the Woods, and Essences which purify the Blood. Externally to the Tumor should be applied some discutient Plaster; as *Emp. de Meliloto, de Ranis cum Mercurio, Diachylum*, or the like. At the same time the Patient should keep strictly to a regular Diet and Course of Life; taken scarce any thing but Ptisans made with Barley, Oats, or the like. In the room of ordinary Drink may be taken a Ptisan, made of Barley, Liquorice, and Anise or Fennel: For a Change may be drank a Decoction of the Woods; and for a greater Variety, a little clear and very small Beer. Wine and all other strong fermented Liquors should be carefully avoided, as they generally increase the Inflammation. If the Patient be kept up carefully to these Restrictions, Venereal *Bubos*, which are not yet inveterate, may be dispersed very commodiously, and without Danger.

VI. But if Advice should be called in too late or the *Bubo* prove so obstinate as not to give way to Dispersion; or if upon any other account the Surgeon is desirous to effect a Cure in the Way of Suppuration, in order to discharge the *Virus* and prevent a *Lues*, he is to diligently promote and quicken the Maturation as fast as possible. But the most powerful Medicines to promote Suppuration have been mentioned at *Chap. III. § IV.* and *Chap. IV. § VIII.* Though it is besides not improper here to rub the *Bubo* with Linen Rags, or the Fingers greased with Butter or Oil, till they grow red with Pain; adding afterwards a maturing Plaster: For by this means a Suppuration is greatly promoted and accelerated. The Plaster to be afterwards applied may be of *Diachylum cum Gummiis, vel Emplastrum de Galbano*, particularly when the Patient can as yet walk pretty well. The Plaster may be taken off, and the *Bubo* rubbed well, three or four times a Day, more or less, agreeable to the several Circumstances. Violent Dancing, Boxing, Fencing, and other such Exercises, are also here very serviceable for promoting the Suppuration. But if the Patient cannot walk any longer from his Pains, which is frequently the Case, it may be proper to apply a maturing Cataplasm instead of a Plaster, such as we have described in the Chapters just now mentioned; which are usually much more effectual than Plasters. The best of these Cataplasms for this Case, are those *ex Cepis sub cinere tostis, vel Farina et Melle, vel ex Fermento, vel denique ex mica Panis Siliginei cum Lacte atque Croco decocta*; which are to be now and then applied warm to the Parts, after they have been first well rubbed.

VII. While the former are carrying on, internal Medicines must be also called in to Assistance. The Patient should take a warm Draught of a Decoction

How the Dispersion is to be effected.

Suppuration how to be promoted.

Internal Treatment.

of the Woods two or three Times in a Day; about eight, ten, or twelve Ounces at a Time, with thirty or forty Drops of *Essent. Lignor. Pimpinellæ albæ, Fumariæ, vel Scordii, vel his similitum, & Mercurii Dulcis aliquot granis quotidie*. For as these greatly attenuate the Blood, drive it towards the Skin, and correct the venereal Venom, they also greatly promote either a Dispersion or a Suppuration.

The Manner
in which
Bubos are to
be opened.

VIII. These Methods are to be followed till the *Bubo* comes either to a Dispersion or Maturation. When the Tumor appears to be perfectly suppurated, the Scalpel is to be taken in hand, in order to make an Incision upon the *Bubo*: But then it must be done with Caution, to avoid hurting any of the large Blood-vessels in either the *Inguen* or *Axilla*; from whence might ensue a very dangerous Hæmorrhage. The better to avoid injuring these Vessels, the protuberant Part of the *Bubo* should be pressed outwards by the Fingers. But, with regard to the Time in which it is proper to make the Incision, it must be always carefully observed not to let it be too soon nor too late: Because both are dangerous: For when they are opened too soon, it occasions Pains, violent Inflammation, and other bad Symptoms: As when they are delayed too late, it generally occasions (as HILDANUS witnesses) the corrupt Matter to return into the Blood, and by infecting the whole Mass, brings on a confirmed *Lues*. If the Patient dreads the Knife, the *Bubo* may then be opened by a Caustic: Here the Reader should turn to what we have said before on Abscesses, *Chap. III. § X, seq.* When the Matter is once discharged, it will be proper to cleanse the Ulcer with some digestive Ointment, mixed with some *Theriaca* and a little *Merc. Præcip. Rub.* Afterwards may be applied a Plaster of *Diachylum cum Gummis*; by which means the Lips of the *Bubo* will be sufficiently softened and cleansed: And then it may be healed with some vulnerary Balsam, applied on scraped Lint.

Whether
and when
the actual
Cautery
should be
used.

IX. Sometimes the ulcerated *Bubo* becomes so stubborn, that it will neither incarn nor cicatrize, by the Help of any Medicines; but always affords a copious Discharge of Matter. When this is the Case, and the forementioned Medicines have been used to no Purpose, *viz. Præcip. Rub. & Alum ust.* prove also to be of no Service, there then remains no other probable Method, in my Opinion, than to cauterize the corrupted Parts to the quick by the actual Cautery: For by that means the Communication of the infected Lymphatics may be cut off. From what we have hitherto proposed, it seems to be sufficiently apparent, that it is always safer and more convenient to bring Venereal Bubos to a speedy Dispersion or Resolution, when a Cure may be that way effected, than to bring them slowly to a Suppuration. But when the Blood is found too much infected, and already corrupted by the venereal Venom, so that a confirmed *Lues* begins to shew itself, the Cure by Suppuration may be then both proper and requisite.

CHAP. XIII.

Of CHILBLAINS.

Chilblains,
what they
are.

I. WE generally give the Name of *Chilblains* to those Tumors which happen in the Hands and Feet from violent Cold; they being at the same time accompanied with Inflammation, Heat, Redness, pricking Pain and Im-

Immobility in that Limb. Sometimes they are of a livid or leaden Colour, and sometimes they break out with Scabs or else with Chaps or Slits, which afterwards penetrate deeper, and become ulcerous. The Humour which they discharge is sometimes a little foetid, and pretty much resembles *Pus* or *Sanies*. The Inflammation also frequently turns to a *Sphacelus*. So that I think we may readily conclude hence, that Chilblains wholly belong and ought to be referred to the Tribe of Inflammations: The more because they excite the same Sense of Heat or Burning with other Inflammations^a, and do, like them, terminate in either Dispersion, Suppuration, Gangrene and *Sphacelus*.

II. Chilblains may be known and discovered by several Means: For (1.) We *Diagnosis.* may observe the common Signs of Inflammation which we have but just now mentioned: (2.) We must enquire whether the Patient afflicted with them has been ever previously affected in those Limbs with vehement Cold or Frosts; to which Travellers and Soldiers, who are engaged in Winter Expeditions and Sieges, are often greatly exposed. Lastly, (3.) It is also a Sign that they are Chilblains, when the Patient feels Pricklings or Shooting in the Part, with Heat and violent Itching; and when the Part affected is found inflexible and almost insensible.

III. While the Chilblains are yet tumified and red, and the Part retains its Sense and Motion without any great Heat and Pain remaining, the Disorder is then of the mildest Kind. On the contrary, when they turn livid, occasion the Limb to become stiff and insensible, or excite pricking Pains therein; there is then Danger of a worse Consequence, lest it should degenerate into a Gangrene, or, at least, a deep Exulceration. When the Skin rises into Pustules or Blisters, like what frequently happens in Burns and violent Scalds, it is a Sign that there is an incipient Gangrene upon the Part. Lastly, when the Member loses its Sensibility, turns livid, soft, and flaccid, there is great Reason to suspect that it is then dead, and sphacelated. *The Degrees of this Disorder.*

IV. We have no room to doubt but that the real Cause of Chilblains is the Cold. For by violent Cold, the Mouths of the small Blood Vessels are not only greatly contracted, but the Blood is also by the same Means rendered too thick; which are the two great Causes of all Inflammation. Nor is there any Symptom that attends this Disorder, but what may be readily explained as a Consequence of these Causes. *Cause.*

V. Though Naturalists are not yet well agreed among themselves concerning the true Nature of Cold, yet I cannot consent to the Opinion of those who look upon Cold to be only the Effect of a Privation or Absence of Heat. But I rather judge it to consist in^b certain hard, sharp, rigid, and saline Particles, which float in the Air: Which are by the Presence of Heat, rendered very minute, soft, flexible, and volatile; but upon the Approach of Cold, they coalesce and become rigid. Now when these Particles insinuate themselves into the small Pores of the Body, they constrict the small Vessels, and by wounding them, either inspissate or stop the Blood. Hence (in my Judgment) we may perceive the Reason why the Cold splits or cleaves the Skin of the Face, Lips, and

^a So TACITUS very elegantly, *Annal. xiii. cap. 15.* Many of the Men, upon the Watch, had their Limbs quite burnt with the Extremity of the Cold.

^b F. HAMBERGERI *Diff. de Frigore.*

other

other external Parts, and afterwards afflicts them with continual prickings and shootings. For the less Motion and Heat the Blood has in any Part, it is the more apt to be inspissated generally. So that it is no Wonder if the Hands, Feet, Heels, Fingers, Toes, Nose, Ears, &c. are more frequently afflicted with Chilblains than any other Parts of the Body; being sometimes slight, but often very violent. Sometimes the Cold is so great as to quite stop the Course of the Blood throughout the whole Body; which then quickly kills the Patient: And we say commonly, that he was frozen to Death, or perished with Cold.

Prognosis.

VI. Though all Chilblains are in the general somewhat dangerous, yet they are more or less so in Proportion to the Extremity and Violence of the Cold which occasions them: In Consequence whereof, more or less grievous Symptoms arise. When the whole Hand or Foot is seized by the Cold, the Danger is generally greater than when it affects only a Finger or Toe. But nothing can be more fatiguing, than that those who have once been afflicted with Chilblains should afterwards become liable, almost every Year, to Inflammations, Pains, Ulceration, and even Gangrene, upon the Approach of any great Frost. Lastly, when Chilblains are ill-treated, by suddenly exposing the Part from the Cold to a Fire, or any thing hot, or by wrapping it up in hot Things, there is great Danger of the Parts becoming black, soft, and putrid: And at length, losing all its Sensation, it may contract a *Spachelus*.

External Treatment.

VII. Having found this to be the State of the Case, it readily follows, that the Cure of all Chilblains must consist chiefly in restoring the Blood to its former Fluidity and free Circulation as soon as possible. But the inspissated Blood requires to be resolved in this Case by Methods very different from those generally used in other Inflammations. For the warm Medicines, which are very beneficial and even absolutely necessary in other Inflammations, are found to be extremely pernicious for Chilblains. Nor can it ever be safe for those who have suffered extreme Cold to expose themselves presently to Heat or a Fire: For Death has been often the Consequence of suddenly exposing the Body to the Vicissitudes of Heat and Cold. It is therefore much more safe and convenient to expose the Patient first to an Air that is either cool or temperate, and to order him to continually exercise his Limbs as much as he possibly can; and lastly, to advance him gradually to a still greater Warmth or Heat. When the Patient is too weak to exercise himself, it will first be proper to bathe the Parts affected with Snow, or cold Water, which will seem to be hot to the Patient: By which means the sharp saline *Spicula*, which stick in the Pores of the Skin, will be drawn out, and the Blood restored to its natural Circulation. Afterwards, when the Limb is become sensible, we may, by Degrees, apply comforting Medicines; such as *Sp. Vini, meri vel cum Theriaca, Oleum item Petræ, Balf. Sulph. &c.* When the Parts affected have been well rubbed and bathed with these, the Patient may then be advanced towards the Fire, or be put to Bed; endeavouring afterwards to excite a gentle Sweat.

Internal Treatment.

VIII. To answer this Intention, great Service will be had from a few Glasses of hot Wine, wherein has been boiled some Cinnamon and Sugar. For by drinking, or rather gradually supping of this, the Patient generally revives and grows warm, and the Blood recovers its Circulation. Though it may not be improper to give alternately with this, a small Quantity of a sudorific Mixture: As,

R. Aq.

*R. Aq. Galeg. Ruta, Scord. ana ʒij. Theriacal. Vit. Matthiol. ana 3vj. Pro-
phyllact. Sylt ʒss. Mixtur. Simpl. vel Tinct. Bezoard. ʒij. Syrup. Cinamom.
Caryophyllor. ana ʒss. Misc.*

A little Draught of this, about three Spoons full, should be given to the Patient every Quarter of an Hour, and the hot Wine as often, till we find the Appearance of a Sweat. If Wine be not at hand, good Ale boiled with Cinna-
mon, Cloves, and Sugar, may well enough supply its Place. Such Suppings as
these should be continued so as to keep up a Sweat for an Hour, or less, accord-
ing to the several Circumstances. For it can scarce be imagined how certain
and expeditious this Method of Cure is for the most grievous Chilblains, which
even threaten a Gangrene. But if the Disorders which proceed from Cold are
much slighter, this Method is then not so directly necessary, but may be laid
aside, though it is much preferable to any other.

IX. When Chilblains tend to Suppuration, it is proper to treat them like other recent Abscesses. First, to cleanse the Wound with some digestive Ointment, as *Ægyptiacum*, &c. then to dress it with *Ol. Ovor. Cere, &c. vel Bals. Peruvian. Essent. Aloes, Myrrhæ, &c.* and lastly, to apply *Emplast. Saturnin. vel de Li-
thargyro*. Sometimes we shall find Benefit from *Oleum Myrrhæ per Deliquium*, as also from *Mures adusti*, if we may believe the *Ephemerides Naturæ curiosorum*. Lastly a Mixture of *Aq. Calcis cum Sp. Vin. Camph.* will be frequently found of great Service here; or *Rapæ cocta*, which many Writers recommend; particu-
larly CELSUS, L. V. C. 38. And PLINY, L. XX. C. 3. if a Compress dipped therein be bound upon the Part, either alone, or after the Application of the forementioned Medicines. But if a Gangrene or *Sphacelus* appear, the Parts affected are then to be treated in the Method we shall propose in the following Chapter.

How a Sup-
puration or
Gangrene
is to be
treated.

X. If a Patient has before been troubled with Chilblains, which are used to return every Year, in the Winter; to prevent the Disorder from returning again, he may arm himself by proper Medicines. The best Preservative for this Pur-
pose, is, to anoint the Parts affected with *Petroleum* or Oil of Turpentine, before and while the Severity of the Winter comes on: But when the Disorder has begun to shew itself again by Tumor, Inflammation, and Pain, the disor-
dered Heel or Finger may be wrapped up in a Swine's Bladder, dipped in the forementioned Oils. But the Cold itself should be always carefully avoided, by defending himself well with proper Cloths or Coverings. The Reader may consult at his Pleasure M. A. SEVERINI *Dissert. de Pernionibus in Lib. de Ab-
scessibus*.

To prevent
Chilblains.

CHAP. XIV.

Of a GANGRENE and SPHACELUS.

HITHERTO I think we have sufficiently considered the Exit of an Inflammation by the Way of Dispersion or Suppuration. It fol-
lows, that we now examine the third and last Method wherein an Inflamma-
tion terminates, viz. a Gangrene and *Sphacelus*, to which Disorders the antient
Physicians

What a
Gangrene
and Sphace-
lus are.

Physicians gave the Name of *Cancrum*. By a *Gangrene* we understand that most great and dangerous Degree of Inflammation wherein the Parts affected begin to corrupt and put on a State of Putrefaction. But by a *Sphacelus* we understand not an incipient, but an absolute and perfect Corruption, or Death of the Parts.

The Signs.

II. A *Gangrene* may be discovered generally from the following Signs: Namely, the Inflammation, with its Symptoms, which have all along been very violent, do generally undergo a sudden Change, as if they were going off. The Parts which were before swelled and tense, do now become soft and flaccid; and upon pressing with the Finger upon the Skin and Fat, its Impression remains behind, as in an *Œdema*: At length the *Cuticula* separates from the *Cutis*, often rising up in Blisters like those in Burns, filled with a reddish, yellowish, and sometimes black Humour; and the Sense of the Limb is, in some Degree, diminished. The chief Mark whereby we discover a *Sphacelus* is, when after a previous *Gangrene* the Parts turn livid, and entirely lose their Sensation, in such a Manner, that the Flesh may be pricked and cut without giving any Pain: And if the *Gangrene* penetrates deep, so as to affect the Nerves and Muscles, the Limb also loses its Power of Motion. Afterwards the Colour of the Part turns black by degrees, and the Skin feels cold and flaccid: And at length it adheres so loosely to the Flesh, that it may be easily pulled up and off from it. Sometimes the Skin becomes hard and dry, like the Rind of Bacon. Lastly, it yields a most intolerable cadaverous Stench, and the *Sphacelus* spreads by degrees through the adjacent sound Parts; unless there should happen to be a Separation of the dead Parts from the sound: Though it frequently stops of itself, and by forming a circular Suppuration, the mortified Parts are cast off from the sound. I have seen some Cases, where from vitiated Humours a Bladder has arisen, without any previous Symptoms, sometimes of a larger, sometimes a less Size, chiefly in the Feet, more generally in the Toes: Which Bladder was full of Water or *Serum*, and spread itself gradually, blackening and mortifying the Flesh underneath, as in pestilential Carbuncles. There have been other Instances, where the Toes of a sudden have turned first livid, then black, with an utter Privation of Sense and Motion: Nor could any Incision draw Blood from the Part.

Causes.

III. The *Causes* of a *Gangrene* and *Sphacelus* are either external or internal. Among the *internal Causes* we reckon an *Erysipelas*, and all other Inflammations which arise spontaneously, and can by no means be dispersed nor brought to Suppuration. Inflammations of this Kind usually proceed from the Blood's being too acrimonious or corrupted by the Bile, or in a *Scorbutus*: Or when the Circulation of the Blood is too quick or too slow, by reason of old Age or any other Weakness; or lastly, when the Patient indulges himself in a bad Course of Life, with respect to his Diet, or is subject to violent Passions, (especially Anger, Grief, and Fear,) during the Time of the Inflammation. By *external Causes* we mean Injuries from the Air, cold Water, and the Application of topical Remedies externally to the inflamed Parts, which are either cooling, astringent, fat, oily, or the like; together with all great external Hurts or Accidents

^a Vid. Celsus, Lib. V. Cap. XXVI. N. 31, 34.

which

which frequently happen to the Body through Falls, Blows, &c. as in Wounds, Fractures, Luxations, &c.

IV. A Gangrene is for the Generality, never without Danger; because it *Progress.* easily changes into a *Sphacelus* or entire Mortification, which never admits of a Cure but by taking off the dead Parts. But a Gangrene which is slight, incipient, and not spread far, but only affects the Skin and Fat, is not very difficult to cure; especially when it happens in a young and stout Patient, in a mild and temperate Season, and does little or no Injury to the Muscles and Nerves^a. But the larger, more violent and confirmed is the Gangrene, and the faster it spreads, the more difficult is it generally to effect a Cure; especially in an old or weak Patient^b, or in an ill Habit of Body from a Dropsy, *Phthisis*, or *Scorbutus*. The Weather also being too hot or very cold, or the Parts affected being near the *Thorax* or *Abdomen* may make the Case more dangerous. Nor can this Case be neglected without the utmost Danger of Life: For the putrid Matter being absorbed by the small Veins; and mixed with their Blood, is conveyed to the Heart and Brain, and corrupts the whole Mass; from whence all the vital Actions are disturbed, the Appetite goes off, and Phrenzy with Death follow. So also in large inveterate Ulcers, in the Extremities and Feet of old People, when they become dry and livid, it is almost a constant Sign that a *Sphacelus* and Death are at hand. Death is also presaged in great Inflammations attended with Spasms, continual Hiccoughs and Belchings, cold Sweats, Faintings, a *Delirium*, and continual Restlessness or Drowsiness, especially if they happen in a Patient who is then afflicted with a Gangrene or *Sphacelus*. And lastly, if the Gangrene be not directly treated with proper Medicines, it commonly turns suddenly into a *Sphacelus*; and if the sphacelated Parts are not timely removed or amputated, the Disorder spreads through the adjacent Parts, and brings on a speedy Death. But in a *Sphacelus* from an internal Cause, and especially at the Verge of Life, the Amputation of a Limb is generally ineffectual: For either the Patient thro' extreme Weakness dies shortly after; or from a bad Habit of Body the Mortification seizes some other Part, and soon terminates in Death.

V. We must therefore always endeavour to treat the Gangrene so as that it may not terminate in a *Sphacelus*. First of all therefore, in plethoric and strong Habits, we are to bleed largely, and to repeat the Operation at Discretion; but in weak Habits, it should be omitted. The Remainder of the Treatment will consist chiefly in observing the three following Directions: *The Cure consists in three Things.*

(1.) *To be careful in the Beginning to remove all violent external Causes of the Inflammation:* As too strict a Bandage in Wounds and Fractures, all foreign Bodies which are stuck in the Parts, as Thorns, Splinters, Needles, &c. improper Medicines externally applied, as Ointments, Oils, and Plasters with cooling and astringing Things, as we before observed: All which should be removed as soon as possible. *(1.) A Removal of the external Causes.*

VI. (2.) The other Observation respects chiefly the *keeping up of the Patient's Strength*, especially in weak and old People. This may be best effected by ordering a Diet which not only affords good Juices, but is also well accommodated. *(2.) A proper Diet and internal Medicines.*

^a See CELSUS, *De Medic. Lib. VI. Cap. 26. § 34.*

^b New Instances may be seen of Death from a Gangrene in old People in LE DRAN's *Obs.* 100 & 101. I have also been Eye-witness to many of the like Cases.

dated to the Age, Constitution, and other Circumstances of the Patient. If the Patient is weak and in Years, is naturally of a cold Habit, has lost much Blood, or abounds with Acidities, the most suitable Diet will be Soops, and strengthening Broths, such as are made of Chicken or Capons, Beef, or some other good Flesh, boiled with Mace, Ginger, or other Spices: As also Suppings of Ale boiled with the Yolks of Eggs, Cinnamon, and Sugar; Eggs themselves poached soft, so as to be potable; strong Gellies of Calves Feet, Harts-horn, and Ivory Shavings; old and rich Wines, as *Rhenish*, *Hungarian*, *Spanish*, *Canaries*, &c. and lastly, fine Ale may do very well, especially for the Poor: With respect to Medicines, the most proper are the *Corroborantia*, usually termed *Cordial*, as the Spirits, Essences, Powders, and Electaries of that Tribe, especially made up or mixed with *Confect. Alkermes*. At Intervals may be drank hot, Tea of Sage, *Scordium Veronica*, and Herbs of the like Nature, with the Addition of a little Cinnamon, or a few Shavings of *Leign. Sassafras Santal. Citrin.* &c. For by these means the stagnating Blood will be wonderfully resolved and attenuated, its sound and healthy Parts will be retained in a due Circulation, and its noxious Parts will be discharged and dissipated. It is also not improper in this Case, frequently to apply a Sponge to the Nose or Carpal Arteries, which has been dipped in *Aq. Regin. Hungar.* also to bind it upon the Temples. In like Manner we shall find almost equal Benefit from the Crumb of Rye Bread mixed up with powdered Cloves; if it be first macerated in very strong Vinegar, or *Hungary Water*, then made into a globular Form, wrapped up in a Piece of Linen Cloth, and frequently applied to the Nose. For Patients who are of a more warm, sanguine, or bilious Habit; Soops and Ptisans mixed with the acid Juice of Citrons or Lemons will be very proper Strengtheners; also Barley Gruel mixed with *Syr. Mali Citrei vel Mori, vel Rubi Idæi, vel Ribesiorum aut Cerasorum acidor.* to be taken daily as a common Drink. When the Heat is small, the Patient weak, or before accustomed to Wine, it may be allowable to mix a little Wine with the Gruel, especially *Rhenish*, and sometimes a Glass of rich Wine may be taken unmixed at proper Intervals; at the same time not neglecting the other Medicines which are proper to be used in Fevers, such as are mild, temperating, cooling, and cordial. But the *Cortex Peruvianus*^a is by many celebrated in this Disorder beyond any other internal Medicines; they look upon it as the only Medicine in this Case, and administer it in the same Manner as in Intermitting Fevers. I have myself seen the good Effects of this Medicine: Though indeed it has failed in some Cases, which proceeded from an internal Cause, and where the Patient was advanced in Years. See *Aët. Acad. Nat. Curios.* Vol II.

(3) External Remedies.

VII. 3. The third and last Observation concerning the Treatment of a Gangrene is chiefly to discharge the stagnating and corrupted Blood from the Parts affected, as soon as possible, and to prevent the neighbouring Parts from being affected thereby. The principal Means to effect this, are (1.) to make use of proper internal *Corroborantia*, or strengthening Medicines; (2.) to make *Scarifications (pro re nata)* by the Scalpel upon the Parts affected, making the Inci-

^a Consult WERLHEFFII *Obs. de Febrib.* p. 332. taken from the Observations of RUSHWORTH, AMIAND and DOUGLAS. See also a particular Treatise published by DOUGLAS on Mortifications.

sions very numerous lengthways upon the Parts, and of a sufficient Depth, in order to discharge the stagnating and corrupted Blood, and to make way for the Ingress of the Virtues of the discutient Medicines which are applied externally; by which means they can the better penetrate through the small Wounds to the internal Parts. Lastly, (3.) discutient, stimulating, and balsamic *Fomentations* and *Cataplasms* which resist Putrefaction, are to be carefully applied to the disordered Parts: Of which Kind is the following Fomentation:

℞. *Aquæ Calc. viv.* ℥j. *Sp. Vin. Camph.* ℥iij. *Sal. Ammoniac.* ℥ss. *M.*

This may be applied hot with Compresses, it being what I have very frequently experienced and still continue to use with very good Success in these Cases, and in other Inflammations. A very extraordinary and useful Mixture is also made *ex Aq. Calc. ℥j. cum Mercur. Dulc. ℥j.* to be applied like the other. In the Hospital at *Amsterdam* the following excellent Fomentation was used with Success in Gangrenes, within my Remembrance:

℞. *Spirit. Vini* ℥iij. *Pulv. Aloës, Myrrh. ana* ℥ss. *Ung. Ægyptiac.* ℥ij. *M.*

Or, *Sp. Vin. cum Aloë, Myrrhā, & Croco leniter coctus; vel Sp. Vin. Camph. cum Theriaca mixtus; vel Sp. Theriacalis aut Matricalis cum sexta quasi parte Elix. Proprietat. roboratus;* or, what GARENGEOT greatly extols, *Vinum calidum, Sp. Vin. simplic. vel Camphora roboratum, vel Sp. Vin. Camph. Sale Ammoniaco acuat.* which he extols as an excellent Remedy to revivify Parts which seem to be dying^b. Or,

℞. *Fol. Scord. Abrotan. Absinth. Rut. recent. ana* M. ij. *Flor. Chamæmel.* Mj. *coq. in f. q. Aq. simpl. colatur.*

℞. *Hujus* ℥ij. *adde Spirit. Vin. Theriacal. ℥iv. Sapon. Venet. ℥ij. Salis Gemmæ* ℥ss. *M. f. Fomentum.*

This Fomentation is to be applied hot several Times in a Day to the Parts affected, by means of Linen or Woollen Cloths: And to give a lasting Warmth, we may apply a hot Tile wrapped up in a thick Cloth, or a hot Bag of Sand.

VIII. For the Poor in this Case, there is a cheap and domestic Remedy, but of great Efficacy, recommended by SIMON PAULUS and others, viz. the *Pickle of Cabbages*. VALESIIUS DE TARANTA has long before taught us, that Horse or Cow-dung boiled in Vinegar or Wine, makes an excellent Fomentation for this Purpose. But a long Time after him, we are told that SYLVIVS and BARBER held the same Remedy as a Secret in this Disease: But the Filthiness of the Medicine makes it unworthy a Physician, it being fitter for the Poor and Vulgar than People of Fashion. But there is a neat, as well as a very efficacious, Fomentation for a Gangrene, to be made of *Scordium*, Wormwood, and Southernwood, either separate or mixed, to be boiled in Sea-water, or, where that is not to be had, Salt-water or Vinegar, to be applied hot like other Fomentations several Times in a Day, giving a lasting Warmth by hot Bricks or Tiles, till the Disorder disperses or diminishes. Thus there will be no Occasion to so frequently unbind the Part, and expose it to the Air, to apply more of the warm

A domestic
Remedy for
the Poor.

^a Vid. KOENERDING in *Libello de Gangræna & Sphacelo, Belgico Sermone edito, Amst. 1698, 8vo.*

^b *Chirurgical Operations*, in the Chapter of a Gangrene.

Fomentation: But it is sufficient, nay even preferable, to soak the Compresses well in the Fomentation, and to keep them hot upon the Parts by the fore-mentioned Contrivance^a.

An obstinate
Gangrene,
how to be
treated.

IX. But the more obstinate and nearer we find a Gangrene is to a *Sphacelus*, the more potent Remedies are we obliged to make use of. Such principally are the very numerous, long, and deep Incisions and Scarifications of the Parts affected down to those which are sound. The Incisions are also made not only longitudinally, but also transversely, where they may be so with Safety, as in the Arm, Leg, and Thigh: By which means the Humours which lodge in the membranous Coverings of the Muscles may be the better discharged, and the Tension of the Membranes taken off, and such as stop the Motion of the Fluids by their Stricture be relaxed. Afterwards the injured Parts are to be well rubbed and soaked with the stimulating, discutient, and balsamic Medicines at § VII; to which may be added the Oil of Cloves, or Spirit of Turpentine, both powerful Remedies in this Case. Then is to be applied a penetrating and discutient Cataplasm, that the Blood in the vitiated Parts may be restored as much as possible to its free Motion. The following may serve for a Cataplasm of this Kind:

℞. *Herb. Scord. Malv. Absinth. Matricar. ana Mij. Menth. Abrotan. ana Mj. Coquantur in f. q. Oxycrati, vase clauso, ad consistentiam Cataplasmatidis sive Pultis, eique postea admisce Salis Ammoniaci ℥ss. Farin. Lin. ℥ij. Ol. infus. Rut. vel Chamæmel. ℥ss. M. f. Cataplasma.*

Always before the Cataplasm is applied to the Part, it should be mixed with some *Sp. Vin. Camph. aut Theriac.* to increase its Virtue. Or instead of this Cataplasm, we may use the following, recommended by the forecited KOENERDINGIUS^b.

℞. *Mic. Pan. Alb. ℥j. Pulv. Absinth. Scord. Rutæ ana Mj. Vini q. s. ad consist. Cataplasmatidis, post levem ebullitionem adde Sp. Vini ℥iv.*

This is to be applied warm. In the mean time, it is a necessary Caution to be observed in the Application of Fomentations and Cataplasms, viz. that they should not be renewed too often, but only two or three Times in a Day: For Experience has taught us, that the Humours may by that means be dispersed and attenuated sooner and with more Ease than by uncovering the affected Parts every Hour, as is customary^c. But we must also carefully observe, that Cataplasms and Fomentations should not only be as warm as possible when they are first applied, but are also to be kept warm all the while upon the Parts, by covering them with hot Cloths, Tiles, or a Bag of Sand: By which means they

^a HARRIS (*in Diff. Chirurg. II.*) advises, that, where an Inflammation is just turning to a Gangrene, the Part affected should be dipped, if possible, in red Wine made hot, and fomented with the same.

^b *In Libello de Gangræna, supra citato.*

^c GARENGEOT will have the Dressing not to be opened above once in the Space of four and twenty Hours, in this Disease, (*in his Operations, Chapter of a Gangrene.*) But because the Parts affected may suffer great Alterations in that Time, and as the Virtue of Medicines will scarce last so long, I think it more adviseable for the Surgeon to inspect the Parts two or three Times in a Day, that he may renew the Medicines, know how it goes forward, and what is to be further done, and that he may prevent any bad Accident.

will penetrate, stimulate, move, and attenuate much better; for if they become cold, they prove not only useless, but very pernicious. All Things well considered, we can hardly affirm, that we have any thing that will cure a Gangrene, or prevent a *Sphacelus*; but if the *Cortex Peruvianus* has the Effects attributed to it in this Disease, we need not be troubled with such a Train of ineffectual Remedies, nor charge our Heads with so many irksome Cautions and Observations thereon^a.

X. But if the Parts are already become quite dead, so as to be entirely without Sense, and soft, so as to retain the Impressions of one's Fingers Ends, and appear to be foetid and corrupted; in that Case, all the Medicines in the World will be insufficient to restore the Parts to Life again. But there remains one, though a miserable Remedy, to preserve the rest of the Body, by amputating the dead Parts that the Disease may not spread through the rest which are sound. But a different Course must be taken in this Amputation, according to the Degree of Corruption, and the particular Nature of the Parts so affected. For if only some Extremity of the Foot, *Tarsus*, *Metatarsus*, Ankle, or Instep, or only the bare Skin and Fat are sphacelated; the whole Member or Foot ought not in that Case to be amputated; but preserving the Limb entire, we are to remove only that Part which we find vitiated, and that, in my Opinion, by means of Suppuration, as we taught in *Chap. XI. § VI. seq. Of Pestilential Carbuncles*, or else to be taken off by caustic Medicines. Those who undertake the Cure of a *Sphacelus* by *Suppuration*, are to take three Things chiefly into Consideration: (1.) To effect the Suppuration as soon as possible; then (2.) to remove the dead Crust or Eschar of the Ulcer, and separate it from what is sound; and (3.) to cleanse the Ulcer, to preserve the sound Part, &c. and heal the Wound.

How a
Sphacelus is
to be treated.

XI. To expedite and quicken the Suppuration, nothing equals the making long and deep Scarifications or Incisions, especially near the sound Parts. For by making innumerable Incisions so deep, till we find that we every way touch the sensible Parts, so as to excite Pain, the noxious Matter lodged under the Eschars, may thereby be more easily discharged, proper Medicines will more readily penetrate the Parts, and the dead Parts will, by that means, be more speedily suppurated and the sooner separate from the sound. But the most efficacious Medicines to promote this Separation of the vitiated Parts from the sound, are Emollients and Balsamics which resist Putrefaction, used in the following Method: *viz.* The incised Parts are to be first well anointed with *Unguent. Digestivum*, and then to be carefully treated with the balsamic Cataplasms and Fomentations. To this Place belongs the following Fomentation, besides those mentioned, § VII, VIII, IX.

A Suppuration, how to be promoted.

R. *Decocti Hordei vel Scordii* ℞j. *Acet. Rutac.* ℥vj. *Spir. Vin. Theriacal.* ℥iv. *Sal. Marin. aut Vulgar.* ℥j. *vel ij.* *Misc.*

^a I made Trial of the *Cortex* lately upon a corpulent female Patient of near sixty, who was afflicted with a Gangrene from an internal Cause, about the lower Part of the *Tibia*, *Tarsus*, and *Metatarsus*, wherein the common Integuments of the Body were already sphacelated and corrupted. But she always threw up the Remedy by Vomit, soon after every time she took it, as she had likewise done other Medicines for some time before; so that I was obliged to lay it aside. But after many other Things tried in vain, I at length restrained her Vomiting by the *Pyrmont Waters*, drank cold (for she threw them up when warm) and performed the rest of the Cure by the Medicines hereafter recommended for the Cure of a *Sphacelus*. Whence it appears, that all Gangrenes and *Sphaceli* from internal Causes are not incurable, as some Authors have asserted.

This

This is to be applied hot with Compresses to the incised Parts, and frequently repeated, till the Disorder appears to spread no further. We know the *Sphacelus* ceases to spread, when the Tumor of the vitiated Parts subside, and the Lips of the adjacent sound Parts become tumid all round: And on the second or third Day after, a Suppuration is gradually formed, and the sound Parts separate from the vitiated. But to soften and promote a speedy Separation of the Eschar afterwards, the following Cataplasm will be found very serviceable:

R. Folior. Scordii M. ij. Malvæ Hyosciam. Alth. ana M. j. Flor. Lavendul. M. ss. coquantur cum Aceto vel Oxycrato ad consistentiam Cataplasmatidis, cui tandem admisce Farin. Lin. ℥ij. Ol. Lin. ℥j. Sal. Ammoniac. ℥ij. F. Cataplasma.

This is to be applied warm over the whole, and it is to be retained in that Condition of Heat as long as requisite, by the Means beforementioned at § VII, IX. This will wonderfully promote the Separation of the vitiated Parts from the sound; especially if the Bark be taken inwardly at the same time. We read in the *Acta Edinburg.* that a *Sphacelus* is often stopped, and the Ulcer healed by the Use of the Bark inwardly, and the external Application of the Spirit of Turpentine only. This Spirit has long since been much extolled by HARRIS, and I myself have found it extremely serviceable.

The Separation and Cleansing of the Parts how to be effected.

XII. After these Medicines have been used, and when the whole surrounding Skin is gently tumified, with Redness, a Crust or Eschar is formed by Degrees, and the sound Flesh begins to separate from the rest: This is then a Sign that the Disorder has done spreading, and that an entire Separation of the vitiated Parts will shortly follow. Therefore whenever this Separation shews itself, it should be promoted as much as possible, by the Use of some suppurating Ointment, such as is commonly termed digestive: Which may be applied either alone or mixed with some *Theriaca*; to be retained on between the sound and dead Parts, (which may be sometimes a little divided by the Lancet) after which the preceding Cataplasm should be applied. But in all future Dressings, whatever of the dead Parts is found loose, or separated, should be removed every Day: Or, if any of the vitiated Parts should in some measure adhere to the sound, they may be separated by the Scissors or Scalpel, without any great Pain or Danger. After this, it will be proper to remove the Cataplasm, and apply some digestive Ointment, or *Empl. Diachyl. vel Saturnin.* in the room thereof, till the corrupted Parts are entirely cast off, and the Ulcer appears to be well cleansed. The Separation of the corrupted Parts from the sound, may be wonderfully promoted by keeping the disordered Limb in a constant Warmth, by Cataplasms covered with hot Bricks or Tiles, to retain the Heat and avoid the frequent uncovering of the Parts to apply fresh Cataplasms. When the sound Parts are sufficiently deterged or cleansed, we must then proceed to their Agglutination or Cure: In order to which we shall find great Benefit from *Ung. Digestiv. vel Basilicum, vel Bals. Arcæi*, together with the forementioned Plasters.

Caustics, which and how to be applied.

XIII. But there are many Surgeons, who, to avoid the Length of Time which is usually taken up in forming a Suppuration, and for some other Reasons, have Recourse directly to *caustic Medicines* in this State of their Disorder. Their Method of Treatment is this: They anoint the Lips only, or else the whole, of the corrupted Parts every Day with *Butyr. Antimon. or Lap. Caust. liquefact.* till the

the living Parts are surrounded by a Sort of Eschar: And always afterwards they apply the forementioned (§ IX and XI.) Fomentations and Cataplasms; in order to prevent the Disorder from spreading, and to make the corrupted Flesh separate from the sound. To this Place belongs the *Aqua Phagedænica* and the *Lixivium rodens* BOERHAAVE in *Mater. Med.* § 462: *Phagedænica* and *Lixivium rodens*.

R. Calc. viv. fortiss. ℥iij. Ciner. Clavellator. ℥ix.

These are to be first ground separately, and to be afterwards mixed together, adding a little Water; then let them be put in a Glass, and stand in a moist Cellar to dissolve: As soon as they are become fluid, filtrate them through coarse and spongy Paper, and then let the Liquor be preserved for Use. When there is a call to use it, let a Brush or Feather be dipped into it, and afterwards rubbed over the Part, once or twice in a Day, as you shall see Occasion: Or you may wet fine Linen Rags with this Liquor, and lay them upon the Part, not neglecting the Use of the emollient Cataplasms at N^o. VIII or IX. at the same time. This Method of Dressing should be continued till the Parts shall suppurate or fall off in Crusts or Scales. If this Application has so far answered your Intention, you may proceed to cleanse the Wound with Digestives, and afterwards heal with a vulnerary Balsam, as we just now directed above at N^o. XII. But if any Mischief should remain underneath after you have healed, you must again have Recourse to corrosive Medicines, and, as to the rest, proceed as we have directed above. The best Form of a corrosive Application that I have seen, is described by BELLOSTE, in his *Hospital Surgeon*: He is not short in commending it himself; he says, when you are furnished with this, you may spare yourself the Trouble of searching for a better Remedy. The following is the Description of it:

R. Spirit. Nitri vel Aquæ Fort. P. ij. Argenti Vivi P. j. m. f. lento calore Mercurii solutio.

The mortified Part is to be wetted with this corrosive Liquor, which will occasion a speedy Separation of it from the sound Parts. But I myself have seen, where the vitiated Parts were not separated from the sound by this Corrosive; and, what is worse, even the sound Parts were destroyed by the Application of it.

XIV. Several Physicians and Surgeons, particularly the famous ^a BOERHAAVE, Of the actual Cautery in this Case. advise cauterising or dividing with the Knife down to the Bottom where it is found, and this Method they prefer to all others. But as this Kind of Treatment carries great Cruelty with it, and cannot be performed without giving the Patient violent Pain, and is frequently attended with Danger, I cannot help preferring the Use of *Suppurants* or *Mild Corrosives*, as a gentler and safer Method of Cure: And indeed the Surgeons of the present Age, in general, are not so fond of calling for the actual Cautery as their Fathers were, especially where they can find Remedies of equal Efficacy.

XV. Lastly, when the *Sphacelus* is so deeply fixed in any Part of the upper or lower Extremity, that it has penetrated through the Muscles, as far as to the Bone, and has resisted all the Force of Medicines, or the proper Time for applying them has been neglected; in this Case, for the Preservation of Life in the Amputation: when to be performed.

Parts that remain untouched, the injured Part must be separated from the Body, with proper Instruments. We shall fully describe the Method of doing this in each particular Part of the Body, when we come to treat of *Chirurgical Operations*. In the mean time, I cannot give the Surgeon a more seasonable Piece of Advice than this: That whenever he thinks the Amputation of a Part necessary, he cannot more effectually consult his own Reputation and his Patient's Safety, than by calling in a prudent *Physician* or two, that may confirm his Opinion of the Necessity of the Operation; and may give him their Assistance if any bad Accident should happen, such as Hæmorrhage, Faintings, Fever, and the like, which are very common Consequences of these great Operations. He should, above all Things, consider the Strength of the Patient; whether he is able to undergo the Operation. And where the *Sphacelus* arises from an internal Cause, and the best Remedies have proved ineffectual, the Amputation should not be hastily undertaken: For, in this Case, it is generally unsuccessful; as GARENGEOT and many others have testified. The Surgeon should also be very careful in keeping up the Strength of the Patient as much as possible, lest he should sink under the Discharge of Matter.

C H A P. XV.

Of BURNS and SCALDS.

A Burn,
what.

I. I BELIEVE no one will be offended at our treating of *Burns* as a Species of Inflammation, since the Appearance, as well as Consequences, of both are exactly the same. Injuries that are received in any Part of the Body, either by Fire itself, or by the Instruments heated with Fire, we call a Burn or Scald. Therefore we do not reckon Fire alone as the Cause of Burns and Scalds, but any other Bodies whether solid and hot, as live Coals, Iron, or other Metal, red-hot or melted; Gunpowder, or boiling Liquors, as Water, Beer, Wine, Oil, &c. are all to be reckoned under this Head.

The Nature
of a Burn or
Scald.

II. When any thing of this Kind is applied to the Body, the Fibres and small Vessels of the Parts that are touched by it, will instantly corrugate and burst, whilst the Blood and other contained Fluids will be extravasated, stagnate, and corrupt. The Burns that we receive from solid Bodies are always attended with more grievous Consequences than those which are occasioned by boiling Liquors (which we call *Scalding*) therefore there are different Degrees of this Injury, as there are of Inflammation.

Four Degrees
of Burns.

III. We may very fairly therefore divide Burns or Scalds into four Degrees. The *first*, and slightest, is that which occasions Heat, Pain, and a small Vesication on the injured Part, in a short Time. The *second* Degree is, when the Part is instantly affected with great Pain and Vesication. The *third* is, when the common Integuments, and subjacent Flesh are so burnt, that they form a Crust. The *fourth* and last is, where every thing is destroyed quite down to the Bone. The third Species is nearly allied to the Gangrene, and the fourth to a *Sphacelus*. This illustrates the near Relation between Burns and Inflammations.

Prognosis.

IV. By considering the Degree of the Burn, and the Use and Consequence of the Part burnt, you may prognosticate in what Manner the Injury will terminate. A Vesication raised in the Hand by the Fire, is less to be dreaded, than

than a slighter Burn upon the Eye; for that very tender and useful Part of the Body, can scarce receive any Injury by Fire, without endangering the Loss of Sight. We should also consider the Extent of the Burn, what length of Time it has been upon the Part, before we can form a true Judgment of the Consequences that will attend it: For the Danger will be greatly increased by the length of Time that the Part has been injured, and in Proportion to the Degree to which the Injury has spread itself. For where the whole Surface of the Body is burnt with Gunpowder, or scalded with any boiling Liquor, though the Injury considered in any particular Part, shall be looked upon as a very slight one, yet by being spread to so great an Extent, it is a Disorder of the last Consequence. In this Case, it is impossible for the Patient to lay down or change his Posture without horrid Pain and Torture, which will prevent his Sleep, increase his Fever, and by Degrees bring on a *Sphacelus* and Death itself. And this is the Case more particularly in Infants, since they have less Strength and Patience than Adults, and want Reason to discover which would be the most convenient Situation for them. The Danger of the Burn will likewise be increased, in Proportion to the Depth to which it has penetrated. Burns of the Face are not only to be dreaded for the Deformity which they occasion, but chiefly for the Inconveniences that they may produce by causing the Eyelids to grow together. Deep Burns of the Neck, if not timely remedied, occasion a Wryness of that Part. You will easily be able to foretel what Danger or Inconvenience will arise from Burns of any other Part, if you diligently consider what we have here said, and are well skilled in the natural Use of the injured Parts.

V. As we observed above that Burns nearly resembled inflammatory Disorders in their Degrees, so do they in the Method of Cure. In the slightest or first Degree of a Burn, the Intension is to disperse it by the Remedies which we advised for a *Pblegmon*, (Chap. II. § IX.) Of these there are two Sorts, *Astringents* and *Emollients*. The best slight Astringent is, *Spiritus Vini^a vel Vulgaris bonæ notæ, vel rectificatus, vel & camphoratus*. This may be applied to the Part with Linen Rags. With the same Intension also you may order *Acetum Lithargyrifatum, Muria Brassicæ conditæ, vel & Oxycratum cum Sale decoctum calidumque*: These may be applied in the same Manner with the foregoing, and should be repeated as you shall see Occasion. *Oleum Terebinthinæ* has very good Effects in this Case, if you apply it in Time, and repeat it frequently. The vulgar Method of applying the burnt Part to a Candle or the Fire, and keeping it in that Position as long as you can bear it, repeating this Process till all Sense of Heat and Pain is entirely removed, is frequently attempted with Success, where the Injury is in one of the Fingers or on the Hand. For the stagnating Fluids are by the Force of the Fire driven back into their proper Channels, and by this Means the Vesication and other troublesome Symptoms which usually succeed, are happily prevented. From hence it appears, that the first Degree of Burns is easily remedied.

Cure of the
first Degree
by dispersing
Remedies.

VI. There is another Method of Cure, which is equally efficacious with the former, though it is founded upon a contrary Intension. This is by *emollient Remedies*, which remove the Tension of the Fibres and Vessels, and restore the

By Emolli-
ents.

^a This is highly and deservedly recommended by the great SYDENHAM, in his *Practical Works*.

Blood to its natural Course, before any bad Symptoms come on. The injured Part may be fomented with Water, as hot as the Patient can bear it, till the Pain and Heat entirely disappear. SYDENHAM highly recommends this Practice, and, in my Opinion, with great Justice. But this Fomentation will be improved if you boil some emollient Ingredients in the Water, as *Althæa*, *Malvæ*, *Verboſcum*, *Sem. Lini*, *Fœnum Græc.* *Mali Cydonii Semina*, or others of this Intention. But emollient Cataplasms are of the highest Service in this Case, made of any of the abovementioned Ingredients for a Decoction, and frequently laid on upon the affected Part as warm as they can be endured. Emollient Oils also have their Use in forwarding this Intention, as *Oleum Lini*, *Amygdalarum dulcium*, *Olivarum*, *Liliorum alborum*, *Hyosciاني*, and the like. These Oils are to be used either by dipping Rags into them, and applying them to the burnt Parts; or they may be laid on frequently with Feathers as fast as they begin to dry away. We must not omit in this Place to mention a famous Liniment of MYNSICHTUS, which he calls his *Unguentum ad Ambustiones*. This is composed *ex Oleo Lini vel Olivarum cum Albumine Ovi mixto*, and applied as the Oils above. *Mali Cydonii Mucilago* is properly enough prescribed in this Case. The Remedies which we have here recommended never give effectual Relief, unless frequently repeated. Therefore when the Face is burnt, they should be spread upon a Linen Mask, which you must keep continually moist by fresh Applications of the Remedy. (See Plate XXXVII.) Where the Neck is burnt, to prevent it from contracting you must have Recourse to a particular Kind of Bandage, which you will find described below, when I come to treat of Bandages.

Cure of the
second Degree.

VII. When the Burn is of the second Degree, which I have described above, attended with Vesication or Pustules, I would by no means advise opening the Vesications or scarifying the lacerated *Cutis*, because this Practice brings on very sharp Pains. You will always find it more adviseable to apply one of the Remedies prescribed above; the nearest at hand, suppose warm Water, burnt Wine, or Spirits of Wine; and renew the Application of it frequently. By this Means you will find the Heat and Pain quickly go off, and the Cuticle will separate from the *Cutis*, without leaving any Deformity. But if, notwithstanding the repeated Applications of these Remedies, some Pain shall still remain, dress the Part with Emollients. The most eligible of these are *Oleum Lini*, *Unguentum ad Ambustionem MYNSICHTI*, *vel Nutritum, de Lithargyrio*, *vel Diapompholygos*: These should be either rubbed into the Part frequently, or spread upon a Linen Rag and applied to it. After the Heat and Pain are removed by these Applications, lay on the *Empl. ad Ambusta, vel de Minio*, which will keep the Skin smooth, and forward the Renovation of the Cuticle. If the Injury is very considerable as to its Extent, and great Part of the Body is scalded or burnt, it will be necessary to open a Vein and bleed plentifully, even *ad animi deliquium*, and afterwards you should prescribe a brisk Purge, of the same Kind which we directed for Contusion. (Book I. Chap. XV. § XIII.) This Method may possibly prevent ill Consequences which usually attend Burns of large Extent, such as foul Ulcers, large Cicatrixes, and Gangrene itself. The same external Dressings are to be applied in this Case which we advised above. When *Infants* are the Subjects of this Disorder, their tender Age prevents us from Bleeding plentifully: Therefore the Revulsion must be made by repeated Purging. That strict Regularity in Diet which we enjoined above in treating of Wounds

Wounds and Inflammations, is never more requisite to be observed than in this Case: All Intemperance is of the last Consequence, as it increases the Fever and Pain. According to the Opinion of the famous DIGBY, nothing takes off the Heat sooner than *Spiritus Salis* given from *Guttæ* x to xv. in any Liquor, and repeated at Discretion. These Methods being timely and diligently prosecuted, heal and restore the burnt Parts of the Body in a most wonderful Manner.

VIII. In the third Degree of Burns, where the injured Part is covered with a Crust or Eschar; the Cure cannot be performed without Suppuration. When this happens in the Face, we should use all our Attention to prevent Deformity, which may be occasioned by a large Cicatrix. Therefore in this Case, the Use of all Plasters and Ointments whatsoever is to be avoided, even though they should be esteemed as valuable Secrets, and highly commended for their Virtue in curing Burns and Scalds. For the Mischief of these Kinds of Remedies is, that they dry up the Wound too fast, and at the same time contract the Fibres and the Skin, and by that Means leave a very unequal Cicatrix. For the same Reason you cannot be too solicitous in forwarding the casting off of the Eschar, and the Evacuation of the Matter that is concealed under. But to discover the happiest Means of performing these Intensions, *hoc opus, hic labor est*. They who attempt this by tearing away the Eschar with their Hands, or endeavour to separate it with the Knife, by no means consult the good of their Patients. The easiest and most successful Method, in my Opinion, is, by the Use of Emollients. Any of the Emollients we mentioned above may be applied warm, and repeated till the hard Crust separates from the live Flesh. The Part should be dressed two or three Times in a Day, and at each Dressing, if you should observe any Portion of the Crust tending to a Separation from the rest, you should remove it with your *Forceps*, and anoint the remaining Crust with Butter, at the same time being never neglectful of the Use of Fomentations. This Method sometimes takes up two, sometimes three, sometimes four Days before it performs its Office. The Crust being now entirely cast off, our next Intension is, to cleanse and heal the Wound. The first of these Offices may be very well executed by any mild digestive Ointment, mixed up with *Mel Rosarum*: The Medicines used for healing the Wound, are principally *Unguentum Diapompholygos, vel de Lithargyrio, necnon Emplastrum ad Ambusta*. But if any Portion of the Eschar is left under these Ointments and Plasters, Experience sufficiently testifies the Danger that will follow, of making a deformed Cicatrix, from the Construction of the neighbouring Parts, and from the Acrimony of the confined *Sanies*. Whoever prosecutes this Method of Cure, should always observe, that if the Eschar does not separate in two or three Days, it will be necessary for him to make a deep Incision into it, that the *Sanies* may have room to discharge itself, (as we advise in the Case of Gangrenes, *Chap. XIV. § VII.*) And then the Fomentations above mentioned are to be diligently applied, the Evacuations by Bleeding and Purging being always premised. Proper Regulations with regard to Diet are never more necessary to be complied with, than in this Case. The best Method of encouraging the Renovation of the Skin, is, by frequently holden the burnt Part over the Steam that arises from boiling Water. Where the Part skins over very slowly, it may be proper to dress the Part with a Cerate made *ex Cerâ & Ovorum Oleo*.

Cure of the
third Degree.

Cure of the
fourth De-
gree.

IX. But what is to be done in the fourth Degree, which we have described, which is always attended with extreme Danger? For when the Burn has penetrated so deep as to destroy all the Parts, quite down to the Bone, Medicine can take no Place. Therefore there remains but one Remedy, and that a dreadful one, to wit, to amputate the injured Limb, that the sound Parts may be saved, as we advised above in treating of a *Sphacelus* (Chap. XIV. § XIV.)

C H A P. XVI.

Of a SCHIRRHUS.

A Schirrhus
what.

I. **W**E have already taught, that the fourth Manner in which an Inflammation terminates is a *Schirrhus*. We usually call a hard Tumor of any Part of the Body, that is void of Pain, a *Schirrus*: This almost always arises from the Inpissation and Induration of the Fluids contained in a Gland; though it may appear in other Parts, particularly in the Fat^a.

Seat of a
Schirrhus.

II. The Seat of a *Schirrhus* is very various: For this Disorder is not confined to the internal Parts alone, to wit, to the Liver, Spleen, Lungs, Mesentery, Pancreas, and in Females to the *Uterus*: But it frequently happens also to the external Parts, as to the Lips, Tongue, Tonsils, *Fauces*, Palate, Gums, Neck, *Mammae*, *Axillae*, *Inguina*, *Penis*, and Testicles; and that generally after a previous Inflammation of any of those Parts. A *Schirrhus* sometimes appears without any previous Inflammation; especially in Subjects of a heavy, phlegmatic, melancholic Habit of Body. Sometimes it is occasioned by an external Injury, as by a Fall or Blow, &c. It is no difficult Matter to determine the principal Cause of the Disorder.

Effects of a
Schirrhus.

III. As soon as a *Schirrhus* is formed, it is an immediate Consequence that not only the indurated Part becomes unfit to perform the Function allotted it by Nature, but the neighbouring Parts also will suffer Pressure, and be impeded in the Performance of their Offices. Therefore it ought to appear no Wonder that the neighbouring Parts should be subject to Inflammations, Exulcerations, Cancer, Gangrene, *Tabes*, Stiffness, Immobility, or the like, according to the Nature of the injured Part.

Signs.

IV. You will be at no great Difficulty in determining the Case to be a *Schirrhus*, when you discover a hard Tumor, on the external Parts (more particularly in those Parts where the Glands are most frequent) and the Tumor is entirely free from Heat, Redness, and Pain. As I am speaking to *Surgeons*, I only treat of external *Schirrh*i: For those which are situated in the internal Parts, fall very justly under the Province of the *Physician*.

Prognostic.

V. In order to form a proper Prognostic of this Disorder, several Things are to be observed. (1.) The more inveterate the *Schirrhus* is, so much the more dangerous will it be, and more difficult of Cure. (2.) A *Schirrhus* happening to young Persons, and to those of a firm Habit of Body, is much more safe and tractable, than when it falls upon Persons advanced in Years: Particularly

^a See a learned Dissert. of GRASHVSIUS, an eminent Physician at *Amsterdam*, on the *Schirrh*us and Cancer.—*Amst.* 1741.

where Children have indurated Glands in the Neck, but are in all other Respects in perfect Health, they are seldom attended with any Mischief; and you usually find they outgrow it: But in Valetudinarians, or where you have Reason to suspect the Pox to be at the Bottom, the Case is far otherwise. (3.) A *Schirrbus* is of more or less Consequence in Proportion to the Consequence of the Part it falls upon, in Performing the necessary or noble Offices of Life. For this Reason, internal *Schirrbi* are always more dangerous than those which happen upon the external Parts ^a. Lastly, (4.) The greater Mischiefs the *Schirrbus* brings on, by so much the more grievous will it be. For as long as it lays quiet, and produces no Pain, so long will it remain without Danger: But as soon as it becomes painful, or is ulcerated, it generally threatens an approaching *Cancer*. It may be proper to inform you in general, that the Cure of *Schirrbi* by Medicine, is usually attended with the greatest Difficulty: Therefore you should never flatter your Patients with the Promise of certain Relief. But sometimes they do admit of a Cure with the Knife or with Corrosives, especially in younger Subjects that are otherwise of a good Habit of Body.

VI. When the *Schirrbus* is of long standing, and the Patient infirm, it is far better to abstain entirely from any Attempt to cure it, than to pretend to bring it to Digestion. For in this Case, it is much to be feared, especially in the Breasts of Women, that whilst you are prosecuting your Intention, the diseased Part may shew its bad Disposition, and become apparently cancerous. On the other hand, where the *Schirrbus* is but newly formed, and you have no Signs of vehement Pain or Hardness, where your Patient is otherwise of a sound Habit of Body, I see no Reason why you should not use both external and internal Remedies, to set the confined Fluids at Liberty. The internal Remedies, which are found principally serviceable in answering this Intention, are the Decoctions of the Woods, digestive Tinctures or Essences, and mild Mercurials, giving between whiles relaxing Medicines, to resolve the thick inspissated Humours ^b. It is very dangerous to trust to the Use of external Remedies alone: Therefore a prudent Physician should always be consulted in this Case, who may not only prescribe proper internal Remedies, but direct the Patient also what Sort of Regimen will be most useful for him to observe, with regard to his Diet.

VII. With regard to external Resolvents, *Plasters* claim the first Place: Such I mean as are made of the warm Gums, as *Gum. Ammoniac. Galban. Opopon. Sagapen. Bdell. &c.* which may be applied alone or mixed together; sometimes with the Addition of *Radix Bryoniæ atque Aristolochiæ rotundæ* finely powdered. Of the same Intention are *Empl. de Galbano, de Gum. Ammoniaco, de Cicutâ, de Ranis VIGONII, vel Diachylon cum Mercurio*; or the following:

℞. *Gumm. Galban. Opoponac. ana ℥j. Ammoniac. Bdell. ana ℥ij. Ol. Olivar. ℥ij. Cera Citrin. ℥ss. Pulv. Aristoloch. long. ver. & rotund. ver. Lapid. Calaminar. Myrrb. Thur. ana ℥j. Terebinthin. Venet. ℥iv. m. f. s. a. Emplastrum.*

^a Where a *Schirrbus* falls on the internal Parts, particularly the Mesentery or the Lungs, it is generally attended with such Tumors, as destroy the Patient.

^b For the internal Method of Cure, see my *practical Compendium*, Cap. xii. Sect. 29. & 30.

(2.) By
Cataplasms.

VIII. The next Place to Plasters is held by *Cataplasms*. Amongst the principal of which may be reckoned the following :

R. *Rad. Bryon. alb.* ℥iv. *Aristoloch. rotund. Angelic. ana* ℥j. *Herb. Sabin. Rut. Scord. Absinth. Flor. Chamæmel. ana* M. j. *Melilot. Sambuc. Altheæ, Centaur. minor ana* M. ss. *coq. cum q. s. Aquæ simplic. ad consistentiam Cataplasmat. vase clauso, sub finem addendo Galban. (Vitell. Ov. q. s. solut.)* ℥iij. *Farin. Lini* ℥ij. *Ol. Lini q. s. f. Cataplasma.*

This Cataplasin, or, if you rather choose it, a Fomentation made of the same Herbs boiled in Vinegar, is to be applied warm, and repeated as you shall see Occasion, not neglecting at the same time the Use of internal Remedies.

(3.) By acid
Vapours.

IX. Some highly recommend acid Vapours in this Case. Sometimes it has been found serviceable to receive the Steam of boiling Vinegar upon the diseased Part, either of common Vinegar, or of that made with Lavender, Alder, Rue, or *Theriaca*. Some sprinkle the Vinegar upon a hot Stone, and receive the Steam through a Funnel. Others set *Sulphur* on Fire, and hold the Part over the Fume. Others again are fond of Fumigations of *Cinnabar*. Great Care must be taken in this Case not to raise too large a Fume, nor to repeat it too frequently, and the Patient must be cautioned not to admit it at the Nose or Mouth. For it can scarce be said how injurious these Steams are to the Lungs, and the Quantity of Mercury contained in *Cinnabar*, makes it very apt to raise a Salivation.

(4.) By
Mercurials.

X. Mercurial Medicines perform Wonders in this Case, either administered in the Beginning, or after other Remedies have failed. Besides giving Mercurials internally, you may make an excellent Ointment, *ex Hydrargyro cum Adipe Suillâ, necnon modico Terebinthinæ, quantum ad eum subigendum sufficit, admixtis in Mortario vitreo vel lapideo.* The *Schirrhus* should be anointed twice or thrice a Day with this, covering it with the *Emplastrum Vigonis cum Mercurio*. But to prevent this Method from raising a Salivation, it will be necessary to prescribe an opening Medicine every fourth or fifth Day, such as *Rad. Jalap. præp.* or *Extract. Rud.* in small Doses. Whilst the Patient is in this Course, his Jaws should be very diligently inspected, and if you find the Glands enlarge and grow painful, you must entirely omit the Use of Mercurials, and repeat your purging Medicines, till all these Symptoms of an approaching Ptyalism entirely disappear. By observing these Cautions, you may have very good Reason to promise yourself Success, where you are called in Time, before the Case is become desperate.

(1.) By the
Knife.

XI. If all the abovementioned Remedies prove unsuccessful; if the *Schirrus* is free and moveable, and its Situation threatens no great Danger from the Neighbourhood of considerable Vessels; if you shall judge the Strength of the Patient to be sufficient to undergo the Operation, you may very fairly call the Knife in Aid, to prevent the Case becoming cancerous (which too often happens.) When you have taken out the *Schirrus*, dress the Wound with a digestive Ointment, and afterwards with the *Linimentum Arcei*, or any other vulnerary Medicine, and heal as we have directed in other Wounds. This Method DEIDIER particularly recommends, *Lib. de Tumor. p. 129.*

When the
Case is en-
tirely to be
let alone.

XII. Where the *Schirrus* is fixed, knotty, uneven, and deeply rooted; where the Patient is of a bad Habit of Body, is subject to form *Schirrhi* from some hereditary

hereditary Taint, or perhaps has formed several already; or lastly, where the Situation of the Disorder is such, that, from the Vicinity of considerable Veins and Arteries, you are in apparent Danger of bringing on an Hæmorrhage which may prove fatal: Then all Attempts to cure, whether by the Knife, or by digestive or corrosive Applications, are to be neglected^a. For this Kind of *Schirrhus* is almost constantly attended with very sharp Pains, and often degenerates into a *Cancer*. In this Case therefore the Pains are to be assuaged, if possib^e, and the *Cancer* to be prevented.

XIII. When you are under Apprehensions of an approaching *Cancer*, your ^{Internal} Business is not only to attempt to correct the Acrimony of the Blood, by the Use ^{Medicines} of both internal, as well as external Remedies, but a strict Regimen with regard ^{to prevent a Cancer.} to Diet, must also be most religiously enjoined. Constitutions of this Sort are much mended by the Use of Broths and Soops of various Kinds, made from the Flesh of younger Animals, with the Addition sometimes of a few Pot-herbs, *sc. Hordeum, Avena, Oryza, Miliun, Spinachia, Asparagus, Scorzonera, &c.* The most wholsom common Drink in this Case, is either fair Water, or a Ptisan made *ex Decocto Radicis Chinæ, Sarsaparill. Gramin. Polypod. Veronicæ, Linguae Cervinæ, Agrimon. Solidagine Sarasenicæ, Herb. Parietar. Capillor. Veneris,* and others of this Kind. When the *Schirrhus* is attended with violent Pains, you may add to the Materials of your Decoction, *Sem. Papaver. albi*, and if the Patient has no Objection to it, you may sweeten it *cum Sirupo Papaver. albi*. It will be very proper also at this Time to correct the Acrimony of the Blood by giving two or three Times every Day, a Dose, *e Pulv. Lap. Cancr. Sale Absinthii, Cinnabari Nativâ, Antimonio, Crudo, Antimonio Diaphoretico*, adding to each Dose, as you shall see Occasion, *Laudani Opiati gr. fs.* to assuage the Vehemence of the Pain. Wonders are also effected in this Case by the *Pulvis Succusve recens ex Millepedibus*, with *Sperma Ceti ad 3j.* to be given with any of the foregoing Powders; by Purges even of the Mercurial Kind, and by bleeding and cupping frequently in Spring and Autumn.

XIV. A thin Plate of Lead, well impregnated with Quicksilver, may very ^{External} conveniently be fastened on the Part, and worn there constantly with some Benefit. ^{Applica-} For this Method frequently lessens the Sense of Heat and Pain, not to say that it ^{tions.} frequently prevents the *Cancer*. But if the Application of a Plate of Lead shall seem to be unequal to the Intention for which it was designed, then you may apply Plasters and Ointments composed of such Ingredients as are most likely to assuage the Pains. Of this Kind are the following:

- ℞. Unguenti Diapompholygos ʒij. Opii puri ʒss. m. f. Ung. quocum pars affecta sæpius inungatur. Vel,
- ℞. Amalgam. Mercur. & Plumbi ʒj. Unguenti Rosati q. s. m. f. Unguentum cum Lintea instar Emplastri applicandum. Vel,
- ℞. Aceti Lithargyrisat. ʒj. Olei express. Sem. Hyoscyam. Papav. alb. Olei infus. Rosar. ana ʒij. m. f. s. a. Nutritum, cui sub finem add. Opii puri gr. vj. ad x. quod linteolis illitum aliquoties quotidie super Schirrhum applicetur.

^a But if the Surgeon is expeditious in stopping the Blood and dressing the Wound, he may sometimes attempt the Cure of the most inveterate Schirrhi, and not without Success. I have myself often undertaken very extraordinary Schirrhi in the parotid and submaxillary Glands, where I was obliged to cut the large Ramifications of the external Carotid Artery: Nor did any one of those Patients miscarry.

If your Patient dislikes the Application of these Ointments, and prefers a neater Application, you may substitute refrigerant Plasters in their room: Such as *Emplastrum Saturninum* MYNSICTH. *de Minio*, *Diapompholygos*; or lastly, that excellent Plaster for alleviating Pain, which is prescribed in the following Manner:

- R. *Succ. recent. express. & purificat. Fol. Hyoscyam. Papav. Hortens. Pbellandi ana ℥iv. coquendo leni igne inspissa; sub finem add. Cerae alb. ℥viij. Ol. infus. Rosar. ℥j. m. f. Emplastrum. Vel,*
 R. *Sacch. Saturn. Ceruss. preparat. Amalgam Mercurii & Saturni, Ol. express. Hyosciam. infus. Rosar. ana ℥ij. m. f. Emplastrum.*

If the Pains are very violent, you may add a discretional Quantity of *Opium* to either of these Plasters, and apply it to the Part.

What is to be concluded concerning Suppurants, Corrosives, and the actual Caustery.

XV. Notwithstanding many Physicians and Surgeons of Eminence at this Time recommend the Use of *Suppurants*, *Corrosives*, and even the *actual Caustery* for the Cure of schirrhous Tumors, yet I cannot help being of Opinion, that the Danger of a Cancer ensuing from the Use of Suppurants or Corrosives^a, and the natural Dread that most People are struck with at the Sight of a red hot Iron, besides innumerable other Inconveniencies, ought to dissuade us from attempting such slow, hazardous, and cruel Methods of Cure. For this Reason it will appear, that the safest and readiest Method of destroying a large or painful *Schirrhbus*, is, to cut the indurated Part entirely out, whether it be situated on the Lips, Salivary Glands, *Mammæ*, or Testicles, provided you run no Risque of a mortal Hæmorrhage, (§ XI, XII.) If you leave any Part of it behind, there is great Danger that it may lay a Foundation for a Cancer: Nay, what is hardest of all, though the *Schirrhbus* be entirely rooted out, it frequently happens that another springs up without any Fault to be laid to the Surgeon. I can by no means approve of the Practice of some Physicians, who order the Bottom of the Wound to be cauterized, to prevent any Return of the *Schirrhbus*, and to take off the Hæmorrhage. In this they are doing nothing^b, since it is of very little Consequence in preventing the Return of the Disorder, and there are many milder and safer Remedies at hand to stop the Hæmorrhage. Therefore when you have finished your Operation, dress as in other Wounds.

CHAP. XVII.

Of a CANCER.

A Cancer, what.

I. **W**HEN a *Schirrhbus* can neither be dispersed, softened, (See Chap. XVI. N. XII and XIV.) or taken out with the Knife, whether it be occasioned by the Vehemence of the Disease, or the Ignorance and Maltreatment of the Surgeon, the Patient will complain of pricking Pains in the Part, and the Tumor will spread itself unequally. This malignant and worst State of a *Schirrus*

^a There are some Instances, where Schirrhi and Cancers have been cured by Caustics; but in general they are unsuccessful.

^b This was observed in the most antient Times. See CELSUS Book V. Chap. XXVII. § 2.

was called formerly *Carcinoma*, by us a *Cancer*. For the Veins about the Part are distended, and form Incurvations, which some imagine bear a Resemblance to a Crab's Claws. As long as the Tumor is entirely covered with Skin, it is called an *occult Cancer*: But when the Skin breaks and is ulcerated, it is termed by the Physicians an *ulcerated Cancer*.

II. The Beginning and Increase of the Disease afford pretty near the following Beginning and Increase of the Disease. Appearances. At first there appears a very small Tumor, which sometimes maintains the same Size for a considerable Time, without any apparent Increase: On a sudden it enlarges beyond all Conception: At first it is attended with little or no Pain, and that only by Intervals: Upon the Increase of the Tumor the Pain becomes intolerable, sometimes so violent as not to be borne without Fainting. If you apply repelling or astringent Remedies to the Part, the Disorder increases wonderfully: Insomuch, that one Month will produce more Increase of Pain and Tumor, than a Year without any medicinal Applications. The Use of Medicine will so far irritate this Disorder, that the Skin will presently break, and form a foul stinking Ulcer.

III. A Cancer, as well as a *Schirrus*, will arise in almost any Part of the Body; Seat of a Cancer. but most frequently in the upper Parts; as the Nose, Ears, Lips, and the Breasts of Women, nay sometimes of Men: A very memorable Instance of which you will find recorded by BIDLO. (*Excercit. Anat. Chirurg.*) But besides these Parts, the Gums, *Fauces*, and Tongue, and even the Parts of Generation are sometimes the Seat of a Cancer.

IV. The Causes of a *Schirrbus* and *Cancer* are common to both: Only these Causes. seem to have acquired some additional Acrimony. The maglignant *Stimuli* of a Cancer are not only produced by the Application of digestive, acrimonious, or caustic Medicines, but they are also occasioned by sundry other Causes. That Sort of Diet is most mischievous which is most apt to produce Acrimony in the Blood. Therefore all Persons that are by Habit of Body obnoxious to Disorders of this Kind, should religiously abstain from Lard and Pork Meats. Grief and Trouble of Mind are very apt to create a cancerous Disposition of Body. It is observable, that old Maids and even married Women that do not breed, are very subject to Cancers in the Breast. This generally happens to them when they are turned of Forty Years of Age, at the Time when the menstrual or hæmorrhoidal Discharge begins to decrease or disappear: Though I have frequently known this Case happen to Persons not so far advanced in Years, even between Twenty and Thirty.

V. The Signs of an *occult Cancer* are as follow. The Patient perceives an Diagnosis. Itching, Heat, or pricking Pain, in or about the *Schirrbus*. The neighbouring Parts grow livid: The Tumor has an unequal Surface, increases in Size, and grows considerably harder than before: The Veins enlarge and become livid, though this Circumstance does not always happen. If the Case is an *ulcerated Cancer*, you will discover it not only by the Ulceration of the Part, by an *occult Cancer* having preceded it, but the following Symptoms will make it evident to Demonstration.

VI. A thin *Sanies* flows from the Ulcer in great Quantities: Sometimes so Symptoms. corrosive and acrimonious, that the Dressings seem as rotten as if they had been eaten by *Aqua Fortis*. The Stench is intolerable, especially to those who are not accustomed to it, and fills the whole Chamber. The Disorder continues to

spread itself wider, the Lips of the Ulcer enlarge, are wonderfully distorted and turned in; are sometimes pale, sometimes red, purple, green, livid, black, or variegated. Pains attended with a Sensation of burning, pricking, gnawing, come on at Times with such Vehemence, that through Anguish and want of Sleep, the Patients are driven to almost Distraction and Despair, which greatly wastes their Strength: Their Appetite and Sense of Smelling entirely fail them, till at last Death delivers them from a miserable stinking Carcase. The Urgency of the Symptoms which we have recounted, depends upon the Patient's Habit of Body, and upon the Situation of the Part affected.

Pronosis.

VII. An occult Cancer, which is not attended with any considerable Degree of Pain, may be endured for a considerable Length of Time, without any great Inconvenience, by a Person endued with Strength and Temperance. But these very same Persons, by an Irregularity in Diet, or medical Application, will be subject to the same grievous Symptoms which we have just enumerated. Notwithstanding what has been said, many have imprudently boasted that they have been possessed of infallible Secrets for the Cure of Cancers: Though at the same time it must be confessed with ^a HILDANUS, and other capital Physicians, who confirm the Opinion of ^b HIPPOCRATES, and ^c CELSUS, that no Physician has yet been happy enough to discover a Medicine from which he could promise any Certainty of Cure in this Case. We have a very memorable ^d Example of this in ANNE of *Austria*, Mother to LOUIS XIV, late King of *France*, who laboured under a cancerous Breast, and was not only attended by the Court Physicians, but by almost every one in that Kingdom who had any Pretensions to the Practice either of Physic or Surgery; particularly by those that boasted of their secret Art in curing Cancers. But notwithstanding all the Attempts of Art, which the Desire of gaining a Royal Reward could excite, no Help could be obtained for her: From which we may very fairly conclude, that there is no Help to be expected from any thing but the Knife. The Hopes we may entertain from Extirpation, depend upon the Degree of the Disorder, the Urgency of the Symptoms, and the Strength and Habit of the Patient. When you shall be of Opinion that the Cancer is so deeply rooted, that it will be impossible to extirpate it entirely, it is far better to lay aside the Operation, than to torment miserable Patients without any Hopes of relieving them. For Instance, when this Case falls upon the *Uterus*, *Fauces*, *Uvula*, *Tonsils*, *Axillæ*, and *Inguina*, it is scarcely ever curable. But Cancers of the Lips, *Palpebræ*, and *Mammæ*, are extirpated with Safety, and sometimes admit of Cure: But there is great Danger of their returning. Some believe a Cancer to be contagious, though I could never observe any Foundation for this Opinion, though I have been pretty conversant in these Cases.

KORTHOLTUS's Remedy for a Cancer.

VIII. In *Ephemerid. Breslaviens. Physico-Medicis*, which were sometime since published in *High Dutch*, in several Volumes, and also in *Praxi Medicâ* NENTERI, you will find great Recommendations of a *Nostrum* of KORTHOLTUS's, which is corrosive and emetic. But I must tell you at the same time, that I

^a In *Lib. de Gangræna*, cap. VII.

^b *Aphorism. xxxviii. § 6. quibus occulti Cancræ fiunt, eos non curare (sive attingere) melius est. Curati enim cito pereunt, non curati vero, longius tempus perdurant.*

^c *Lib. V. Cap. XXVII. § 2.*

^d See *Mémoires de Madame DE MOTEVILLE*,

Tom. V.

am informed by Men of the greatest Credit, that it is of no Efficacy in the true Cancer.

IX. When a Cancer yields to no Medicine; when it happens in old Age, or to a bad Habit of Body; when it is situated under the *Axillæ*, or near large Blood-vessels, or has spread itself to a great Extent, and is of long standing; or where the Patient is afflicted with a Cancer in more Parts than one; in either of these Cases the Knife is foreign to our Purpose. For as the vitiated Parts can never be entirely extirpated, the Surgeon, by attempting the Operation, will only make Matters desperate, and hasten the Death of his Patient. Therefore the best Method of treating an incurable Cancer, which is not yet broke or ulcerated, is, (1.) To endeavour, without using any violent Means, to prevent it from degenerating into an Ulcer: (2.) To relieve and assuage the most threatening Symptoms. In this Manner we may prolong the Prospect of Death, and many other Mischiefs, by a palliative Method.

When a
Cancer is
incurable.

X. If any one is desirous of palliating this dreadful Case, he must look for Assistance, not from Medicine alone, but principally from a diligent Observation of Rules with regard to Diet: Which we have already explained at large in discoursing of a *Schirrus*. (Chap. XVI. § VI, &c.) The Patient should lose Blood in Spring and Autumn, but if of a plethoric Habit, oftener; and the Bowels should be constantly kept open. It would not be amiss also to advise the Use of *Goats Milk*, unless the Patient has a particular Aversion to it: You may give it either alone or boiled with vulnerary Herbs or Crayfish. By this Method you may very successfully prevent very dangerous Symptoms. But if notwithstanding this, violent Pains succeed, it will be proper to give him a Dose of *Opium* now and then, or to boil *Sem. Papav.* in his Drink: Or you may make an Emulsion of them. These Medicines, by giving Sleep, are excellent Remedies against Pain and Weakness. The same Method is to be observed with regard to external Treatment, which we prescribed in the above cited Place.

Palliative
Method.

XI. Almost the same Method is to be observed in treating a Cancer that is broke or ulcerated: Only in this Case the Part is to be kept clean, the *Sanies* frequently wiped off, and the Ulcer to be filled with soft dry Lint; or, in order to lessen the Pain, the Part may be anointed before it is dressed, with such Medicines as obtain most Credit for answering this Intention. The principal of these are, *Ol. Myrrhæ per deliquium, vel ejus Essentia cum Essentia Succini, vel Aqua Calcis sola, aut pauxillo Sacchari Saturni admixto. Vel,*

How an
ulcerated
Cancer is to
be treated.

R. Aceti Lithargyrifati ℥ j ℞. Olei Rosacei aut Solani ℥ j. m. f. in mortario plumbeo aut vitreo Unguentum, quod Nutritum appellatur, Vel,

R. Aq. Rosar. Flor. Sambuc. Papav. erratic. ana ℥ ij. Sacch. Saturni, Essent. Opii ana ℥ j. Spirit. Vini Theriacal. ℥ ij. M. Vel,

R. Aqua Sperm. Ranar. Solan. ana ℥ iij. Plumb. ust. ℥ j. Sacchari Saturni ℥ ℞. M.

In the Place of these you may substitute a vulnerary Decoction *ex Herb. Mar-rab. Agrimonie, Veronica, &c.* or *Succ. Solan. & Plantagin.* The Ulcer may be very easily washed with any of these at every Dressing, and the Lint may be wetted with them. But if the Pain should be very violent, you may then in-

crease your Dose of *Opium* or Essence of *Opium*, or you may moisten the Pledgits with Essence of *Opium* at every Dressing: Since it will be impossible to assuage the Pains with a less powerful Medicine. The Essence of *Opium* to be used in this Case, is not to be prepared *cum Spiritu Vini*, but rather *ex Aquis destillatis, ex Solano, Floribus Papav. Erratic.* DIONYSIUS advises a raw Piece of Veal to be laid on the Part. Dry Powder should never be sprinkled upon a Cancer, as it is customary on other Ulcers. The Dressing with *Plumbum ustum cum Sem. Lini aut Psyllii Mucilagini mist.* mitigates the Pain in a surprizing Manner. Varying the Application in this Case is very useful, but we should stick most to those Remedies which seem to agree best with the Patient. Lastly, the *Aqua Vulneraria sive Sclopetaria*, commonly known by the Names of *l'Eau d'Arquebusade* prepared with *Aqua Solani*, rather than with Wine or Spirits, being laid on warm and frequently repeated, is of eminent Service.

How a Cancer is to be extirpated.

XII. When the Cancer is so circumstanced that you may venture upon Extirpation, without Danger of any considerable Mischief; you are first to administer mild cathartic Medicines to cool and correct the Acrimony of the Blood: (§ XI.) But more particularly to prepare the Patient by an exact Regimen with regard to Diet, before you attempt the Operation. The Instruments which are used in taking off Cancers of the Lips, Eyes, *Mammæ*, and Parts of Generation in the Male, you will find described below in their proper Place, when I come to treat professedly of Chirurgical Operations. The Wound is to be dressed in the same Manner which we have directed for treating other Wounds; with a digestive Ointment, and vulnerary Balsam. The Dressings should be laid on lightly, and but seldom repeated, which will greatly conduce to the Cure. When the Wound is healed, the Patient should observe a very strict Regimen with regard to Diet through the remaining Part of his Life. He should entirely abstain from all acrimonious, salt, acid, or spiced Meats: He should frequently take gentle cooling Purges, the best of which are the Purging medicated Waters; not omitting to lose Blood by Cupping or the Lancet whenever he perceives any Fulness, particularly at Spring and Fall. For if these Rules are neglected, the *Schirrus* and Cancer easily return.

CH A P. XVIII.

Of an OEDEMA.

An Oedema, what.

I. **H**ITHERTO we have been treating of Tumors that arise from Inflammation, and of the ill Consequences that attend them. We proceed now to describe that Sort of Tumor which is attended with Paleness, Cold, and yields little Resistance, retaining the Print of your Finger when pressed with it, and accompanied with little or no Pain. The Name proper to this Tumor is *Œdema*, or a *Phlegmatic Tumor*. It obtains no certain Situation in any particular Part of the Body, since the Head, Eyelids, Hands, sometimes Part of the Body, sometimes the whole Body is afflicted with it. When the last mentioned is the Case, the Patient is said to be troubled with a Cachexy, *Leucophlegmatia*, or Dropsy: But if any Part of the Body is more subject to this Disorder than another, it is certainly the Feet; which are at that Time called
swelled

swelled or œdematous Feet. We shall treat distinctly of them in this Place, that it may appear what is the true Nature and rational Treatment of Phlegmatic Tumors, in whatever Part of the Body they shall be found.

II. The proximate Cause of an *Œdema* is doubtless to be found in the too Causes. great Serosity or Viscidity of the Blood, which stagnates in the very minutest Vesicles of the Fat, or *Tunica Cellulosa*, and by this means stretches out the Skin with which it is immediately covered. This vitiated State of the Blood chiefly arises in Men, (1.) who are either of a cold and phlegmatic Habit of Body, or are advanced in Years: It chiefly falls upon them in cold Weather, or in the Winter, when the Inclemency of the Season heightens the Disorder of Nature. It is no wonder therefore that Persons whose Legs swell greatly in the Day, frequently find themselves much lighter and slendered in those Parts every Morning, which certainly proceed from the Warmth they receive in Bed. (2.) Another Cause of this Disorder is, an *Irregularity in Diet*, by over eating or drinking, and by the constant Use of crude, cold, and hard Meats. (3.) *Intermitting Fevers or Agues* conduce very much to this Disorder: Especially if the Patient indulges himself in an intemperate Use of cooling Liquors whilst the hot Fit is upon him, and his Thirst very urgent. (4.) This Disease frequently owes its Rise to *too plentiful a Discharge of Blood* from a Wound, from the Nose, or Lungs, by vomiting, or from the hæmorrhoidal Vessels or *Uterus*. Or, (5.) Sometimes to *Obstructions of the menstrual Discharge* in Women. Or, (6.) To a *Compression of the Vena Cava*, by the Weight of the *Fœtus* in Women far gone with Child, or by any schirrhous Body in the *Abdomen*; which greatly hinders the Return of the Blood from the lower Limbs. Or, (7.) To *too sedentary a way of Life*, or to too great an Indulgence in lying in Bed or sleeping. Or lastly, (8.) To a *Phthisis and Difficulty of Breathing*; or to any other Disorder or Fatigue of Body, which disturbs or destroys the natural Force of the Heart in maintaining the Circulation with due Vigor.

III. From what has been delivered, it plainly appears by what Signs an *Œdema* manifests itself. Therefore this Observation alone remains to be added; that the harder the Tumor is, and the longer the pitting which is made by the Finger remains visible, the stagnating Fluid is in such Proportion thicker and more tenacious.

IV. *Œdematous Tumors* that come with other Diseases, as a Dropsy, Con- Prognosis. sumption, Asthma, Intermitting Fever, or with an Increase or at the going off of the menstrual Discharge, can seldom be cured but by curing the Distemper from whence they arise. *Œdematous Tumors* of the Legs are of very little Consequence in Women with Child; especially if they are naturally of a good Habit of Body: For the Pressure being taken off the *Vena Cava* by the Delivery of the Woman, the Tumor quickly disappears in Consequence. But weakly Women do not come off so well in this Case, particularly if the Tumors remain long after Delivery: For they are, in this Case, frequently the Forerunners of Dropsy, Asthma, and Death. The more inveterate these Phlegmatic Tumors are, by so much the more dangerous and doubtful are they to be esteemed. On the other hand, those that are recent and attended with no other Diseases are very easily cured. Those that are Attendants on an Intermitting Fever, are cured with much greater ease, than those which are the Consequence of a large Profusion of Blood, or of any other Weakness. Those which arise from an Obstruction

Obstruction of any natural Discharge, are cured by the Return of that natural and customary Discharge of Blood. Young Persons are more readily cured of these Tumors in the lower Limbs than old: For indeed Persons advanced in Years are generally incurable in this Case. When Tumors of the Legs and Feet are treated with improper Remedies, especially externally, Asthma and Death will, by Degrees, be the necessary Consequences.

Method of
Cure.

V. The Method of treating œdematous Tumors is surprizingly different, according to the different Causes to which they owe their Rise. Therefore we are first to make diligent Search after the genuine Cause of the Disorder before we attempt its Cure. And as from the Nature of the Distemper, the internal Parts are to be set right, we must by no means put our whole trust in external Remedies; but are chiefly to expect Help from internal Medicines prescribed by a *prudent Physician*^a. The external Method of treating these Tumors in the Legs and Feet, is usually, (1.) To have Recourse to frequent *Frictions* with warm Cloths, to be repeated Morning and Evening till the Parts grow red and hot. (2.) Then the Limbs are to be diligently preserved from the Injuries of the cold Air: For which end he may wear Stockings made of some warm Furr; and at Night he should keep hot Bricks about his Legs and Feet, to attenuate the Blood. (3.) After this you may apply a proper Bandage, which is to ascend gradually from the Feet up to the Knees: This strengthens the Limb, and prevents a Collection and Stagnation of the Blood in any Part of it. (4.) After the Use of proper internal Medicines, and the external Methods which we have just mentioned, it will be very proper to use strengthening Remedies externally. To this end you may place the Limb over burning Rectified Spirits of Wine, wrapping it up in Cloths, in such a Manner that it may receive the Steam: This will incline the stagnating Fluids to escape through the Skin, or render them fit to return into the Circulation, and at the same time restore the natural Tone to the Limb. (5.) Many, especially amongst the common People, apply, as a Family Medicine, the *Chelidonium majus*, first bruising it, and then laying it on as a Cataplasm. Others apply in the same Manner the *Perticaria acris*, either alone, or mixed with the forementioned Remedy, and from this Method they frequently find great Relief: For they are very active Medicines, and powerful Resolvents. There are still others again who use *Raphanum Rusticanum Rasum*, or *Lepidium*, which they boil in Wine and apply hot for the same end. But the most excellent Remedy to execute this Intention seems to be the Cataplasm which is prepared *ex Columbarum Fimo, Sale atque Aceto inter se invicem commixtis, calidè sæpius impositum*. Of the same Virtues are Fomentations made *ex Cineris Querni Lixivio parat. cum Aq. Fabri Ferrar. addendo Spirit. Vini uncias aliquot, Aluminiſque portiunculam*. This may be applied with Stuphs, or the Legs may be bathed in the Liquor as warm as it can be well borne, twice every Day. *Aqua Calcis* is said to be of equal Service, used in the same Manner either alone, or mixed *cum Spiritu Vini & Alumine*. The following Mixture also answers the same Intention:

℞. *Spirit. Vini, Aceti Vin. ana ℥j. Alum. Crud. ʒj. ſ Vitriol. ʒj. M.*

This is to be applied as we directed above. But you must carefully take notice, that after rubbing and fomenting, the Legs are to be well covered with Bandages

^a See my *Practical Compendium*, Chap. II. N. 14.

and Stockings. The Patient should drink sparingly, use moderate Exercise frequently, and be very diligent in the Use of proper internal Remedies. Sometimes the medicinal Waters, particularly those of the sulphureous Kind, are found very serviceable in this Case, but not always. GARENGEOT advises scarifying the Feet, first in the inward and middle Part of the *Tibia*; and when those Wounds are healed, afterwards to repeat it on the opposite Side: And to apply to them the *Emplastrum Norimbergense*, as a most excellent Medicine: Cap. *De Paracentesi Abdominis*. HARRIS, a celebrated *English* Physician, in *Dissert. Chirurg.* IX. relates, that he has cured the most dangerous of these Cases, *cum Croco Marte aperitivo, Cortice Peruviano mist*. Others affirm, they have done it with the *Cortex* alone: others again are confident, that this is a hurtful and dangerous Method. The best Way is, to consult some prudent Physician, who best knows how to advise you what Methods to pursue, and what to avoid.

CHAP. XIX.

Of ^aFUNGIOUS TUMORS, and DROPSY of the JOINTS.

I. **O**EDEMAT^a are nearly resembled by fungous Tumors of the Joints. A fungous Tumor, what. These are Disorders of very bad Consequence, and therefore deserve a particular Disquisition. That they have been entirely omitted or slightly passed over by many Chirurgical Writers, seems to proceed from their Ignorance of the true Cause from which they arise: For whether they owe their Origin to a Collection of Blood or serous Fluids, corrupted Matter, Pus, Flatus, or to any other Cause; they could not pretend to distinguish. When we speak of a *Fungous Tumor of the Joints*, we mean that Tumor of the Limb which arises at the Joint, looks pale, is void of Heat and Pain, easily yields to the Pressure of the Fingers, but rises again instantly, like a *Fungus* upon removing the Finger, leaving no Pit behind. Though no Joint either of the upper or lower Limbs can be said to be secure from this Disorder, yet the *Knees* are most subject to it, because they abound in a large Quantity of Fat and glandular Bodies, which are concealed amongst the Ligaments and Tendons: There are several Species of this Tumor: For some are smaller, some larger, some softer, some harder, some more, some less glutinous with regard to the State of the inspissated Fluid; and as they are particularly subject to Injuries from Falls, or other Accidents. Again, some are attended with Pain, some entirely free from Sensation. ^b In some the noxious Humours are situated without the Joint, which Kind of Tumors are properly the fungous Bodies we are now treating of: But in others they are collected and retained in the Joint itself, as the *Serum* is contained in the Testicle in an *Hydrocele*, many of which I have seen and cured. This last-mentioned Disorder may not improperly be called a *Dropsy of the Joint*, and may probably be distinguished from the fungous Tumor of the Joint, by the Inlargement that ap-

^a In *England* they are known to us by the Name of White Swellings, or Scrophulous Tumors of the Joints.

^b PURMANNUS, in his *Chirurgia Curiosa*, has given us a Description of a very large *Fungus*.

pears all round the Joint; whereas the fungous Tumor is situated more on one or the other Side of it. From what has been already said of these two Cases, I think it plainly appears, that it is no difficult Matter to distinguish one from the other.

Causes.

II. The proximate Cause of fungous Tumors is, without doubt, the viscid glutinous *Serum*, which is found about the Ligaments of the Joints, and is apt to stagnate after the Ligaments have received any considerable Violence from a Fall or Blow. Sometimes the Tumor rises in the external Parts, sometimes in the Articulation itself, by which the Ligaments being weakened, the Part loses its natural Motion. But when the Nerves or Blood-vessels are greatly pressed upon by the Tumor, the Parts below are usually deprived of Nourishment, and the Joints by Degrees being greatly enlarged, the neighbouring Parts diminish and waste.

Pregnosis.

III. We have already observed, that in fungous Tumors of the Joints, the Ligaments are too much lengthened and relaxed, and the natural Strength and Motion of the Limb are lessened in proportion to the Degree of the Disorder. And as the lost Vigor of the Part is very difficult to be restored, and the Tumor will not readily yield either to Suppurants or dispersing Remedies, any one will be sensible that the Surgeon has no easy Task upon his Hands, when he undertakes the Cure of a fungous Tumor upon the Joint. The Suppuration of the Part is not only difficult to bring about, but it is generally a very dangerous Attempt: For by this Means *Caries* and incurable *Fistulae* are sometimes produced, which require Amputation of the Part. When the Tumor is recent, and not very large or hard, it sometimes admits of Cure by the Application of digestive and corroborating Remedies: Whereas they will be greatly irritated by emollient Applications. But where the Tumor is large and inveterate, no Success is to be expected from any thing but the Knife: And even that is sometimes unequal to the Cure, or improper. If the noxious Fluids are contained in the Joint, they may be let out by Incision: But upon healing the Wound, the Tumor will generally return.

Cure of recent fungous Tumors by Dispersion.

IV. In order to render the Cure of recent and mild fungous Tumors the easier by dispersing Remedies, it will be best to rub the disordered Part well every Day with warm Cloths, fomenting it afterwards with *Spirit. Vini tartarifat.* This Method is to be constantly observed, till the natural Strength and Form of the Limb are restored. PURMANNUS's Fomentation is excellently callulated for this Purpose:

R. Muriae Halecum ℥ ij. Acet. Vini fortissim. ℥ j. Fol. Salv. M. ij. Vitriol. Rom. ʒ j ʒs. Alumin. Crud. ʒ vi. M.

These Ingredients are to boil together for half an Hour, and to be used in the Manner we have above described. When the Tumors begin to disperse, and the Parts to recover their Strength, it will be very beneficial in perfecting the Cure, to foment the Limb well several Times every Day *cum Spiritu Vini Tartarifat, vel cum Oleo Tartari fetido*; laying on the Bandages immediately afterwards to keep the Part warm, and defend it from the Injuries of the cold Air, of which it is very susceptible. Lastly, I cannot help adding a Form under this Head, by the Assistance of which I have frequently made very happy Cures of fungous Tumors:

ʒ. Lithar-

R. *Lithargyr.* lib. ℥. *Boli Armen.* ℥j. *Masticbis,* *Myrrhæ ana* ℥℥. *Aceti Vini* lib. j. m. & coque hæc omnia per horæ quadrantem, tinctisque in ist decocto linamentis crassis calida semper & matutino & vespertino tempore in lectulo applicentur.

At the same time proper purging Medicines, Attenuants, and Sudorifics should be diligently attended to.

V. If the fungous Tumor is of long standing, and will not give way to the dispersing Remedies which have been prescribed, almost the only Hope left is, to make an Incision into the dependent and most convenient Part of the diseased Joint, taking great Care to avoid wounding the Ligaments or Tendons. You are well justified in following this Method, by the Examples of those two celebrated Surgeons^a WURTZIUS and^b PURMANNUS. By this means the stagnated Serum is instantly evacuated, if it is contained in one Cavity; but if it is contained in different Cells, it will all escape in a few Days. Tents daubed with some digestive Ointment, and sprinkled with Allom, are serviceable in this Case. Before you make your Incision, you should pull the Tumor down as low as you can with your Fingers, and make a tight Bandage above to retain it in this Situation. By this means the most convenient Part for the Incision to be made in, will lie fair; and when the Opening is made, the Serum will readily burst out like Blood at the opening a Vein, or Lymph in tapping for the *Hydrocele* or *Ascites*. When this is done, if any Tumor still remains, dress the Part with *Emplastrum Diachylum vel Oxycroceum, vel WURTZII Rubrum, vel Aqua Calcis, vel Spirit. Vini*; by continuing any of these Applications, what remains inspissated in the Tumor will entirely disperse. When the Limb is restord to its natural Shape, heal the Wound with vulnerary Balsams, diligently avoiding the Use of fatty or oily Medicines, as being very hurtful to the Tendons and Ligaments, with which those Parts abound. If the Serum contained in the Tumor is so glutinous, that it cannot discharge itself for want of Fluidity, you must throw up attenuating Injections at every Dressing. The best calculated for this Purpose are those which are prepared *ex Decocto. Agrimonie, Aristolochie, aut Alchymillæ cum Rosarum aut Chelidonii Melle misto*. Injections of this Kind will quickly dissolve the stagnating Serum, and disperse the Tumor.

Cure of
Inveterate
Fungus's
(1.) by the
Knife.

VI. Though those fungous Tumors, which are opened with the Knife, are more readily discharged and healed, yet some Surgeons prefer the Application of caustic Medicines to the Knife, discharging the collected Serum upon the falling off of the Eschar: After which they proceed in the same Manner which we advised above. Whilst the Part is healing, in either Case, I think, it would be very proper to warm and invigorate the Ligaments and Tendons, especially when the Injury falls upon the Knee, by the Use of some nervous Ointment, or aromatic Spirit.

(2.) By Cor-
rosives.

VII. It very frequently happens, that after you have evacuated the inspissated Serum, and cicatrised the Wound, you shall have a fresh Collection of a vitiated and corrupt Fluid, which I am an experienced Witness of. To prevent this Accident, the following Method will be serviceable. Let the Patient continue in a strict Course of proper purging, sudorific and attenuating Medicines, and

Remedies to
prevent the
Return of
the Tumor.

^a *Chirurg.* p. 268.

^b *Chirurg.* P. III. p. 46. *it. Chirurg. Curios.* p. 622.

keep the Wound open with Tents for a considerable Time, cleansing it every Day by throwing up an Injection prepared in the Manner we directed in the preceding Section. PURMANNUS highly commends this Manner of keeping the Wound clean, and attests, that after the sixth Time of Injecting, he has not only seen the Wound clean, but filled up with new Flesh. It will be proper also to inject *Aqua Calcis vivæ*, or *vulneraria Gallorum* sometimes; and to cover the external Part with a warm Plaster, or to foment it with some Liquor of the same Intention, especially in the Knees. This Method is recommended by that experienced Surgeon FELIX WURTZIUS, as the most likely Means of preventing the Return of the Disorder.

When an
Opening is
not to be
made.

VIII. Before I leave this Head I must inform you, that *it is not every fungous Tumor of the Joints which is so situated, that it can be opened with Safety.* For if the Tumor is of very long standing, hard, of a great Size, or the Patient is of an infirm weakly Habit of Body, you must entirely lay aside the Knife. For this Method of Treatment would produce more Mischief than Good, by laying a Foundation for new Disorders; to wit, *Caries, Fistulæ, and Gangrene.* As to the other Species of lymphatic or phlegmatic Tumors, which require the Knife, such as *Dropsy, Hydrocele, Hydrocephalus, and Ranula*, I shall treat more fully of them in their proper Place, when I come to describe Chirurgical Operations. In the mean time, with regard to Swellings in the Knee, consult SCULTETUS's *Observat.* 79. WURTZIUS's *Surgery*, p. 268. and MECKEEN and ROONHUYSEN, *Observ. Chirurg.*



INSTITUTIONS OF SURGERY.

PART I. BOOK V.

Of ULCERS.

CHAP. I.

Of ULCERS.

I. **A**N Ulcer is a Disorder so well known to every one, that when I have mentioned the Name, it would be impertinent to illustrate it with a Description. A Definition in this Case would only serve to make the Matter more obscure. You have a very just and clear Notion of an Ulcer, when you are told, that it is a *Solution of the soft Parts of the Body and the Skin*, arising from an internal Cause, *sc.* and Inflammation, Abscess, or sharp Humours. Wounds also and Contusions, by length of Time, degenerate into Ulcers, and properly assume that Name.

II. The proper Seat therefore of an Ulcer, is, any soft Part of the Body, *sc.* the Skin, Fat, Glands, Muscular Flesh, and even the *Viscera*. If any of the hard Parts of the Body, that is, of the Bones, are ulcerated or corroded, the Disorder is rather called a *Caries* or *Spina Ventosa*, than an Ulcer. But from the Similitude there is between both Cases, I think they may very properly be treated of under the same Head, and I have therefore joined them together.

III. If you desire to know how Ulcers differ from *Abscesses*, *Contusions*, and *Wounds*, a diligent Examination into the Nature of each, will give you full Satisfaction upon this Head. Though *Wounds* and *Contusions*, as well as *Ulcers*, consist in a *Solution of Continuity of the soft Parts of the Body*, yet they widely differ in this Circumstance: To wit, Wounds and Contusions always arise from an external Cause, and are produced in a Moment: Whereas Ulcers owe their Rise chiefly to internal Causes, § I. and come on by slow Degrees. *Abscesses* are as it were the first Beginnings of Ulcers, or rather are immature Ulcers: Which is the Case when Inflammations come to Suppuration, the Skin still remaining whole. But as soon as an Opening is formed in the Skin, and the matured Pus discharges itself, from Abscesses they become Ulcers, whether the Skin is eroded by the Pus, or the Opening made by the Surgeon's Instrument.

Various
Kinds of
Ulcers.

IV. Ulcers cannot be confined to one Species, for they differ, (1.) In the Part of the Body which they infest. For sometimes they are found in the Skin, Fat, and Glands, sometimes in the Muscular Flesh. (2.) In their Size; for they are spread wide, others occupy but a small Space: Some are deep, others shallow: Those which penetrate deep, and are narrow, particularly if they are very small at their Opening, are called *Sinuses* or *Fistulae*. (3.) In their standing; whence they are called *recent* or *inveterate*. (4.) In Number and Degree of Symptoms, or accidental Disorders that attend them: Some are very mild, and are thence called *benign*: Others are *malignant*, that is, either *attended with very acute Pains*, or *fetid, putrid, fatty, discharging great Quantities of Ichor, spreading wide, cancerous, callous, fistulous, or attended with Worms*. (5.) In their Causes: Hence Ulcers are called *scorbutical, venereal, cancerous, pestilential*, or are said to be occasioned by *Fascination*. Lastly, (6.) Ulcers differ in their Situation, and are called *Ulcers of the Nose, Fauces, Breast, Anus, and Fistule Lacrymales*, as they attack this or that Part.

Causes.

V. I think those Physicians amongst the Moderns, draw too hasty a Conclusion, who assert, that the *principal Foundation of Ulcers* is owing to a *foreign acid Humour*, which corrodes and destroys the Parts of the Body which it falls upon, in the same Manner that *Aqua fortis* would: Since there is no acrimonious Humour, whether it is of a salt, luxivious, alkaline, or acid Nature, but would corrode the Body, and raise an Ulcer of some kind. And, to say Truth, the stagnating Blood generally degenerates into an Acrimony of the alkaline Kind, and is by no means, according to the Opinion of some, converted into an Acid: This you may collect from the fetid Smell of Ulcers. The Physicians have pronounced an *Alkali* to be any Saltness or Acrimony, which is adverse to all Kinds of Acids, as Salt of Tartar is to Vinegar, Oil of Tartar *per deliquium* to Spirit of Vitriol. As there are many Kinds of Poisons, so of acrimonious Things, and therefore of Ulcers. The more Virulence the Acrimony is possessed of, by which the Body is corroded, so much the worse will be the Consequence of such Corrosion: The Ulcers will be the more fetid, the more dangerous, and perhaps incurable, which is the Case in Cancers. But Ulcers do not arise from Acrimony alone; but from any other Cause by which the Blood may be made to stagnate and corrupt. Upon this Principle you frequently see *Tumors, Inflammations, Wounds, Contusions, Fractures, Luxations, Schirrhus, Cancer, and Caries* degenerate into Ulcers: Which though they begin with very slight Symptoms, yet, either from a bad Habit of Body, Irregularity in Diet, or Ignorance in the Surgeon, they very often become extremely dangerous.

Diagnosis of
inveterate
Ulcers.

VI. Although most Ulcers may be discovered by the Sight: Yet, in order to have a thorough Knowledge into the Depth and Tendency of the *Sinus*, and whether it is accompanied with a *Caries* of the subjacent Bone, you must have Recourse to the Use of the Probe. You will learn best from the Patient whether it be recent or of long standing. From him also you may collect the Cause of the Inveteracy of the Disorder; whether it is owing to a subjacent *Caries*, to an irregular Course of Life, or to the unskilful Treatment of the Surgeon. The Ulcer is said to be *benign*, if it is recent, and attended with no violent Symptoms; if the Pus is of a moderate Consistence, whitish, without Acrimony, and of no bad Smell; and lastly, if the Patient is otherwise healthy, and of a good Constitution. On the contrary, it is called *malign*, if the Patient is of a weakly

scor-

scorbutical, or hydropical Habit of Body; if the *Pus* is too fluid, acrimonious, fetid, yellow, brown, green, or blackish, or of the Consistence of Lard. The Disorder is equally dangerous, where the Patient suffers very intense Pain, or where the Ulcer is so formed that it cannot admit of being treated like Wounds and recent Abscesses, with Digestives and vulnerary Balsams.

VII. *Ulcers* are said to be *unclean and putrid*, in which the Flesh appears corrupted, soft, white, yellow, or livid; where the Matter is thin and glutinous, and at the same time green or variegated. They are called *running or rheumatic Ulcers*, when there is a very plentiful Discharge of a thin *Sanies*. We term them *Corroding and Spreading Ulcers*, if the Matter is corrosive enough to destroy the adjacent Parts, sometimes slower, sometimes faster, in proportion to the Degree of Acrimony of which it is possessed. *Fistulous Ulcers* are those which penetrate deep, under the Skin, or between the Muscles, especially if the *Sinus* is wide, and the Opening very narrow. In *callous Ulcers* the internal Parts are lined with a hard and almost cartilaginous Substance.

Nature of
putrid, run-
ning, corro-
ding, fistu-
lous, and
callous
Ulcers.

VIII. *Ulcers* are termed *venereal*, when they are the Consequence of Familiarity with an infected Person, and either accompany or succeed other venereal Disorders. They are confined to no particular Part; but more frequently arise in those Parts which are the Seats of venereal Bubos, or in the Nose or Throat, sometimes also upon the *Penis*: Ulcers of this last-mentioned Part are called by the *French, Chancres*. In the other Sex the *Labia Pudendi*, or Neck of the Womb, are chiefly obnoxious to this Symptom of the Pox. *Cancerous Ulcers* are either Cancers themselves burst out, the Sign of which we have given you above, in *Book IV. Chap. XVII. § V, VI.* or very nearly approach the Nature of *Carcinomata*, if you regard the Degree of Pain with which they are affected, or the Quickness of their Increase. *Ulcers* are called *carious*, when any neighbouring Bone is deprived of its *Periosteum*, or affected with a *Caries*. But we shall treat more fully of this Case below. *Ulcers* are, by the Vulgar, believed to arise from *Fascination*, when Needles, Hairs, Threads, Rags, Egg-shells, Coals, or any preternatural Body of this Kind is found in an Abscess or Wound. But in good Truth, it is my Opinion, that not only the Sign by which the common People pretend to discover Charms, but even Fascination itself, is an Imposition which can be swallowed by none but Persons loaded with Superstition. For many Ulcers have been said to be owing to Fascination and Witchcraft, which have evidently proceeded from natural Causes.

Nature of
venereal,
cancerous,
carious Ul-
cers, and of
those which
are occasi-
oned by
Charms.

IX. Recent and benign Ulcers, like recent Abscesses, are generally attended with no great Difficulty in the Cure; especially if they happen to young and robust Subjects. The Difficulty of the Cure will arise in proportion to the Malignity of the Symptoms and the Inveteracy of the Disorder. Therefore *putrid, running, fistulous, callous, carious, and cancerous Ulcers*, require great Skill and Address in the Cure. Those quackish Persons who boast of a secret Plaster, or Ointment, for the Cure of Ulcers of ever so great Inveteracy, or attended with the worst of Symptoms, egregiously impose upon themselves and their credulous Patients. If the Patient is weak and infirm, advanced in Years, has great Acrimony in his Blood; if the Ulcer has a very offensive Smell; if the *Pus* is of a bad Colour and full of Acrimony; any of these Circumstances will render the Cure of the Ulcer very difficult. If there are many Ulcers, or if an Ulcer spreads very wide, the Discharge will be very plentiful, and reduce the Patient wonderfully. It is never good Practice to heal old Ulcers of the Legs, especially

Pregnosis, of
malignant
inveterate
Ulcers.

especially in weak Habits, or in Persons advanced in Years. For Experience teaches us, that they are always in the best State of Health whilst this Drain is kept open in their Legs: But if you heal the Ulcer, and stop up the Discharge, the worst of Disorders follow, to wit, Pains in the Head, Vertigines, Apoplexy, Epilepsy, Difficulty of Breathing or Asthma, Diarrhoea, Dysentery, and Inflammations on the internal Parts, and many other Disorders of this Kind, till Death brings up the rear. That excellent Physician CRATO deserves to be consulted upon this Head, in his *Epistolæ Medicæ*, where he treats this Point very judiciously. Where inveterate Ulcers dry up upon old Subjects, and the Lips grow hot and livid, there is immediate Danger of *Sphacelus* and Death itself. The Cure of inveterate Ulcers is much easier in young and robust Subjects; but you will always find it a useful and indeed necessary Observation to you, that in Ulcers of this Kind, you are not only to remove the immediate Cause of the Disorder, but you are also to restore the Blood to its pristine Purity: And in doing this you will usually meet with great Difficulty. Therefore if the Disorder is very inveterate, and the Patients are tired with the continual Use of Medicines, and with the strict Regimen to which they are enjoined, it is no wonder if these Ulcers often fail of a Cure, even in robust Persons.

Prognosis, of venereal, fistulous, callous, carious, and cancerous Ulcers.

X. *Venereal Ulcers* cannot be cured till you have thrown the venereal Poison out of the Body by proper Remedies: Till you have done this, external Remedies are to no purpose. *Fistulous, callous, and carious Ulcers*, are never cured without the Knife: For if you heal the Ulcer and bring on a Cicatrix, it will burst out again, and afflict the Patient with greater Vehemence. A Caries, especially if it is large and situated in the Joint, will bring on so large a Discharge of Matter, that if the Limb is not taken off in Time, the Patient will be entirely run down. This will appear very plain to you when you read what will follow in its Place, on the *Caries* and *Spina Ventosa*. The same may be said of cancerous Ulcers: For if the Part affected is not taken off, there remain no hopes of Cure, as we declared above, treating of a *Cancer*. But even after taking off the Part, Cancers frequently return, and entirely destroy the Patient. When Ulcers fall upon the *Viscera*, they are generally deemed incurable, because out of reach, both of the Hand and of immediate medical Applications.

Cure of recent Ulcers.

XI. The Method of treating Ulcers differs greatly according to the different Nature of the Disorder. When the Ulcer is quite recent, it may be treated as a recent Abscess or Wound. First, therefore it is to be cleansed, then to be filled with new Flesh, and lastly to be covered with an even Cicatrix.

(1.) How the Ulcer is to be cleansed.

XII. The Ulcer, if recent, is to be cleansed in the following Manner: First, the Matter is to be discharged; if it does not flow freely enough of itself, you must press it gently with your Fingers: If there is a deep *Sinus*, you may cleanse it with an Injection, or, if it lays fair enough, with Lint. Any small Membrane or fatty Body, that remains corrupting at the Bottom of the Ulcer, will readily enough cast off afterwards, at the Removal of every Dressing, which should be a digestive Ointment spread upon Lint, and secured upon the Part with *Diachylon*, *Diapalma*, or any other Plaster of that Kind, covering the Whole with proper Compresses and Bandages. This Method is to be continued till the Ulcer appears to be entirely cleansed, that is, till the Fundus of it becomes florid, and it appears to be filled with new Flesh.

XIII. Hav-

XIII. Having proceeded thus far, the next Intention is, to fill the Ulcer with new Flesh. This Intention is satisfied with those Medicines which are vulgarly called *Sarcotics*. The best of this sort appears to me to be the common *Unguentum Digestivum*: For where there is no remarkable Impediment, I have never found it necessary to use any other sarcotic Remedy than this. It is not easy to say what should induce almost all Physicians to cry up certain balsamic Remedies as having a peculiar Virtue in generating new Flesh. Besides, our Digestive is endued with a true balsamic Power: but to say the Truth, the Generation of new Flesh is not so much owing to the Use of any particular Medicines, as to the Benefit of Nature. The whole Business of the Surgeon in this Case is, only to remove any thing that may impede the Cure. If any shall think that the *Unguentum Digestivum* is not equal to this Intention, they may have my free Consent to substitute in its room *Balsamum Arcæi*, *Balsamum Peruvianum*, *Balsamum de Mecchâ*, *Balsamum Sulphuris*, *Essentia Myrrhæ & Aloës*, *Oleum Myrrhæ per Deliquium*, *Oleum Ovorum*, or any vulnerary Balsam of this Kind, till the Wound is entirely healed.

(2) How the Ulcer is to be filled up.

XIV. If the Ulcer penetrates very deep, so that you can neither reach the Bottom of it with your Eye, nor apply your Medicine to it, it will then be proper, at every Dressing, as soon as you have pressed the Matter out of it, to inject some cleansing healing Liquor to it; such as *Decoctum Agrimonizæ vel Aristolochiæ cum Melle Rosarum*, vel & *Myrrhæ atque Aloës Essentia mistum*; or that which BELLOSTE cries up, in his *Hospital Surgeon*, *Decoctum ex Nucum Foliis cum admixto Saccharo*. This Method of injecting is to be continued till the Bottom is entirely healed: Afterwards you may proceed to fill up the Ulcer in the Manner we advised above.

What is to be done in deep Ulcers.

XV. The Ulcer being filled up with new Flesh, it remains that we bring on a proper Cicatrix. This is best done by dressing the Part daily with dry Lint, till the Cicatrix is formed. But if, notwithstanding this Method of dressing, the Flesh becomes luxuriant, and the Ulcer is moist, it must be sprinkled with drying Powders, *ex Mastiche, Thure, Sarcocollâ, Colophoniâ, Lapide Calaminari ac Tutia*, covering it with dry Lint, and securing all with some Plaster, till it is entirely healed. But if the luxuriant Flesh has grown above the Skin, the best way is, to eat it down with *Vitriolum Cæruleum*: Or if that is not strong enough, you may use the *Pulvis ex Præcipitato Rubro atque Alumine usto* till it becomes quite even. Then you may proceed as directed above.

(3) How the Cicatrix is to be formed.

XVI. Lastly, it is scarce possible to say what great Relief the Patient will receive from observing a proper Regimen with regard to his Diet. Practitioners in Surgery have in all Times observed, that Ulcers of the most malignant Kind have been sometimes cured by this means, almost without the Assistance of any other Remedy: Whilst on the other hand the most benign Ulcers have so far degenerated, as to become altogether incurable by an irregular way of living. In this Case therefore, the Patient should most diligently avoid all acrimonious, salt, acid, fatty, or heating Meats, or those that are hard of Digestion; according to the Directions which we gave you above when we were treating of Wounds. (*Book I. Chap. I. § XLV, and the following.*) If your Patient already labours under a bad Habit of Body, which obstructs the Cure, it is your Duty to call for the Assistance of some skilful Physician, that may take off the constitutional Complaint, by prescribing proper internal Medicines.

A proper Regimen to be observed.

CHAP. II.

Of the Method of treating ^a FISTULOUS CASES.

The Cure of
Fistulæ per-
formed,
(1.) By
cleansing.

I. **W**HEN you discover, either by your Eye or the Probe, that Ulcers are attended with *Fistulæ* ^b not yet become callous, your readiest Way of curing them is, to lay them open with the Knife to the Bottom, if you can do it with Safety, and afterwards cleanse and heal them. But since Patients are very unwilling to consent to the Use of the Knife, you may cleanse them with a proper Injection, or dress them with *Ung. Digestivum* upon Lint, as we advised in the foregoing Chapter. Many Surgeons are for conveying their Medicine to the Bottom by the Assistance of *Tents*; but as they are very apt to do Mischief by their Hardness, or too great Length, bringing on a *Callus*, Inflammation, or too great Flux of Humours upon the Part: Therefore I think it most adviseable either to throw them entirely aside, or at least to guard as strongly as possible against any of these Inconveniencies, by making them very soft, and as short as the Case will admit of. BELLOSTE, and MAGATUS before him, both Men of great Name in Surgery, have been so offended at the mischievous Abuse of Tents, that they have absolutely forbid the Use of them: And I am so far from disagreeing with these Authors, that I readily join with them in Opinion. I think the Use of Tents is never to be justified, but where the Opening of your *Fistula* is so small, that you are in constant Fear of its healing: And even in this Case your Tents can scarcely be too short, and should be made of the softest Materials.

(2.) By
Pressure.

II. The next Thing to be observed in treating *Fistulæ* is, to press the *Fundus* as near to the Opening as possible. When the Ulcer is cleansed, and the proper Dressings applied, you must clap a small Compress, or a slip of Plaster doubled up in the Form of a small Compress, upon the Part where you judge the *Fundus* of the *Fistula* to be seated; securing all with a Bolster, Plaster, and Bandage, as usual. In rolling up, the best Method will be to place the Beginning of the Roller upon the *Fundus* of the *Fistula*; or at least to make your fastening tight upon that Part. This will direct the contained Matter towards the Opening, and the Bottom will heal before the Rest of the *Sinus*. This happens best in *Fistulæ* of the upper or lower Extremities; especially if the *Fundus* is in the upper Part of the Limb, and the Opening in the lower Part.

III. When *Fistulæ* penetrate so deep that you cannot come at the Bottom of them with your Dressings, you must inject such sort of Liquors as we advised in the foregoing Chapter. You may also very properly add the following:

R. *Ung. Digestiv. ex Terebinth. & Vitell. Ovi parat.* ℥j ℥. *Mell. Vulgar. vel Rosar. vel Chelidon.* ℥j. *Spirit. Vini Vulgar.* ℥ix. M. Vel,

R. *Decoct. Scord. vel Abrotan. vel Agrimon.* ℥viij. *Spirit. Vini Simpl.* ℥iij. *Elixir Proprietat. vel Essent. Myrrh. & Aloës* ℥j. *Mell. Rosar.* ℥ij. M.

These are to be injected at every Dressing, and the Opening of the *Fistula* should be kept close, that the Medicine may be retained as long as possible, which will

^a See FABRIC. AB AQUAPENDENTE, MARCHETTI, and a Treatise by ASTRUC, who treat fully and judiciously on *Fistulæ* of the *Anus*.

^b In *E gland* we call this Case a *Sinus*, never a *Fistula*, till it becomes callous.

VI. If the Operation is succeeded by a large Discharge of Blood, which frequently happens; at the first Dressing you must fill up the Wound with dry Lint: Afterward you may dress with *Unguentum Digestivum cum Ægyptiaco, vel Præcipitato Mercurii Rubro*, till the Wound is cleansed. Every thing else is to be done as we advised above, treating of recent Ulcers. The Method of treating *Callus*, *Caries*, and those sort of Disorders which attend *Fistulæ*, shall be delivered separately below. CELSUS *Book VII. Chap. IV.* upon *Fistulæ* in general, and particularly on the *Fistulæ Costarum, Ventris, & Ani*, deserves a diligent Perusal. Consult likewise SCULTETUS's *Armament. Chirurg.* and MUYS's *Podalir. Rediviv.* p. 41, 42.

Of the Method of treating STUBBORN ULCERS.

I. HITHERTO we have treated of mild and well-conditioned Ulcers. It follows that we now describe Ulcers of a more malignant Nature, which will not admit of a Cure by any of the Methods we have hitherto laid down; From the Stubbornness of their Disposition they are called in the medical Schools, *Ulceræ Dysepulotica*, *Chironia*, *Cacoëthica*, *Rebellia*, *Contumacia*. No Man in his Senses will deny that they have all their proper Causes to which they owe this bad Disposition. These malign Ulcers usually appear in Subjects of a bad, scorbutical, cachectical, and hydropical Habit of Body; or where you have the Pox, a *Caries*, or *Callus*, where there is great Acrimony of Blood, or a Cancer at the Bottom of the Case. Whoever expects to be attended with Success in treating these Cases, should diligently search out and extirpate, if possible, these Causes of the Disorder. But this in most Cases is so difficult, that it will foil the most experienced Surgeon or Physician: Nor will quackish
M m Empirics

Various Causes of Stubborn Ulcers.

Empirics get any Credit here, let them boast ever so long of the secret Virtues of their famous Plasters and Unguents.

(1.) When there is a bad Habit of Body.

II. When you can discover nothing of a *Fistula*, *Callus*, *Caries*, putrid Flesh, or of Worms concealed in the Ulcer, it owes its Obstinacy to the bad Habit of the Patient, either from a Redundancy of a glutinous, acid, acrimonious, or bilious Quality in the Blood; or from some venereal Taint; or from Irregularity in Diet; or, in Women, from an Obstruction of the menstruous Discharge; in Men, of the Hæmorrhoids. In order to correct this vitiated Habit of Body, you must not only have Recourse to internal Remedies, but must also insist strongly on a strict Regularity in Diet. This is of so great Consequence, that I have seen the worst of Ulcers yield to a^a proper Regimen of Diet, without the Use of one internal Remedy; only cleansing them daily with proper Medicines, or dressing them with any common Ointment, Oil, or Balsam, covering the Dressing with any Plaster in Use, as the *Emplastrum Saturninum vel Diapompholygos*; or indeed with the simple Application, of a Plantain Leaf, or Birthwort. With regard to eating and drinking, those Things which set lightest upon the Stomach should be preferred, and should be given in very small Quantities at a Time. For every thing that is too salt, acrimonious, acid, hard, or crude; all sorts of Fat, Lard, or Swines Flesh, every thing even of the lightest Kind taken intemperately, must be looked upon as Poison in these Circumstances. Persons of a sanguine Habit should avoid warm Things: Those of a phlegmatic cold Habit, cooling Things. A proper Regimen or Abstinence is very much assisting in the Performance of the Cure, by attending diligently to the Application of proper external Remedies. Therefore the Ulcer should be kept very clean; that the corrupt Matter, by lying long upon the Part may not get an additional Acrimony, and so occasion the spreading of the Disorder. After it is well cleansed, it is to be dressed with *Unguentum Digestivum*, to which may be added, *Myrrha Mastiche, aut Colophonia*; or a Decoction *ex Juglandi Foliis cum injecto pauco Saccharo*; or *Decoctum Viridis æris cum Vino*. In some Cases, *Spiritus Vini Simplex, vel Aqua Calcis cum Linimentis immissa, vel Lapide Medicamentoso CROLLII Roborata*, has great Power in healing and drying up Ulcers. If you discover any *Sinuses* or *Fistulæ*, they are to be laid open; and to be cleansed afterwards in the Manner we taught above, and to be healed with *Balsamum Peruvianum, Copaibæ, Sulphuris Terebinthinatum*, or with any other agglutinating Medicine. Lastly, if internal Remedies are not neglected, there is no doubt but that the very worst of Ulcers may generally be cured.

(2.) Running Ulcers.

III. When these stubborn Ulcers are accompanied with a large Discharge, there is Reason to apprehend that the Blood abounds with too large a Quantity of thin acrimonious *Serum*; and they are from thence called *Rheumatic Ulcers*. This cannot be drawn off more properly than by cathartic Medicines. Where the Strength will admit of it, your Intention may be executed by prescribing Cathartics and Diuretics, to be repeated frequently; at the same time cautioning your Patient against drinking too freely. *Millepedes præparati, Essentia Succini, Myrrhæ, Balsami Peruviani, Tinctura Tartari, Tinctura Antimonii tartarifata*, or any other Tinctures or balsamic Essences, of known Virtues for promoting the Secretion of Urine, are very properly prescribed in this Case.

^a Amongst many others, consult DOLÆUS in his *Encyclopædia* upon this Subject.

Large and frequent Draughts of small Liquors, which are frequently the Causes of these Disorders, are diligently to be avoided. On the contrary, strong Ale, old Wine is to be used, but sparingly, for common Drink at Meals: But the Patient should drink nothing between Meals. With regard to a proper Choice for Diet, those Meats are best which have the fewest Juices in them, and are most roasted: Flummery, Calves Feet, and Calves Foot Jelly are very proper Diet. The external Medicines after proper Evacuations, should be those that obtain the greatest Reputation as Dryers. The principal of these are, *Aqua Calcis*, *Lapis Calaminaris*, *Tutia preparata*, *Creta*, *Mastiche*, *Thus*, *Colophonium*, & *Cinnabaris Nativa*. When you have sprinkled any of these finely powdered upon the Ulcer, you are to lay over it the *Emplastrum Diapompholygos*, *Saturinum*, *vel de Lapide Calaminari*.

IV. Ulcers which spread and corrode the neighbouring Parts, are in the Medical Schools called *Phagedænic Ulcers*, and betray a great Degree of Acrimony in the Blood: which is to be tempered as much as possible by the Physician, by the Use of lenient Medicines. The principal among these are, *Decocta ex Rad. Chin. Sarsaparill. Symphyt. Polypod. Lignit. Scorzon. Lapath. acuti, Herb. Malv. Alb. Hyperic. Sanicul. Agrimon. Marrub. Alb.* and the like. With regard to Diet, you may observe the Directions we gave above at § III. All seasoned Meats are bad in this Case. The Patient will receive great Relief by taking a purging Medicine sometimes with the Addition of some *Mercurius Dulcis*: This will not only lessen the foul Discharge of the Ulcer, but will also destroy the Acrimony of the Blood, and forward the Cure. The same external Remedies are to be used here as we recommended at § II, III. especially with the Addition of Mercury. The Use of them is to be diligently observed, till the Cure is perfected.

V. *Cutaneous Ulcers* that attack the Skin of Adults as well as Infants, particularly about the Face, approach very near to the Nature of Phagedænic Ulcers. For they not only arise from an Acrimony in the Blood, but are apt also to spread abroad. Therefore in both these Cases, those Medicines will prove most effectual which keep open the Bowels, and soften the Acrimony of the Blood. (§ III and IV.) Adults in particular should be advised to drink freely of what we call the Decoction of the Woods, or *Decoctum Radicis Lapathi acuti, aut Herbae Fumariæ*. Either of these Decoctions should be drank by the Patient to the Quantity of $\frac{3}{4}$ viij. or $\frac{3}{4}$ x. three or four Times in a Day, as hot as he can bear it. The first Draught should be taken in Bed, and a Sweating should be endeavoured to be raised. To these you may very properly add *Essent. Fumariæ, Lignorum, Succini, vel Tinctura Antimonii tartarisata ad guttas xxx vel xl.* You may also prescribe absorbent Powders to be taken with these Decoctions, *ex Antimonio & Flor. Sulphur. parat.* A proper Regimen of Diet should be strictly observed in this Case. In Infants Cases who are yet at the Breast, you should prescribe Medicines that will constantly keep the Body open and alleviate the Acrimony of the Blood: And at the same Time the Mother or Nurse should observe the Course we have prescribed above, and be very exact in her Diet. With regard to external Application, you will receive great Benefit from *Oleum Tartari per Deliquium*, if you dip a Pencil or Feather into it, and dawb the Part three or four Times every Day, either with this alone, or with the Addition of *Oleum Ovorum atque Cerae*. Over this you must lay a Plaster, as the *Empl. Saturninum*,

turninum, vel de Minio, vel de Spermate Ceti cum Camphora, to correct the Acrimony, and to prevent Injuries from the external Air. If the whole Face should be affected, which is frequently the Case in Infants, a Plaster will be very improper: But you may make a Linen Mask, such as we described above, treating of Burns. You will find the Use of the following Medicines in this Case, by no means to be despised; *Ol. Philosophorum cum Oleo Ovorum, necnon Aqua Calcis, vel & Aqua ex edulcoratione Antimonii Diaphoretici*: The Ulcer should be daily washed and cleansed with one of these. If you please, in the room of these you may anoint the ulcerated Parts with *Unguentum de Lithargyrio vel Diapompholyg. vel de Enula*, with which in very stubborn Cases may be mixed *Argenti Vivi vel Mercurii Præcipitati Rubri portiuncula*. If these Ulcers are attended with a large and foul Discharge, it will be proper to sprinkle them with some absorbent or drying Powders, as *Pulv. Tutie, Lapid. Calaminar. Cerussa, Creta, &c. cum Cinnabari Nativâ, aut Præcipitato Rubro mist*. Or you may work any of these up into an Ointment *cum Cremore Lactis*, and use it as such.

(5.) Cancerous Ulcers.

VI. *Cancerous Ulcers* are the most grievous of all the corrosive Kind. In these Cases the same internal and external Remedies are to be used which we directed for the ulcerated Cancer; (*Book IV. Chap. XVII. § XII.*) Nevertheless, according to the Opinion of that great Physician and Surgeon M. A. SEVERINUS, there is more to be expected from manual Operation than Medicine in this Case: For many have been cured by the Knife or actual Caustery, where Medicine has availed nothing. But whenever you shall think it adviseable to use the Knife or Caustery, remember that you go to the Bottom, and leave no Part of the diseased Matter behind you: If you should, all your work would be in vain. Some prescribe here an *Aqua Phagedænica* made in the following Manner: *R. Aq. Calc. Viv. ℥ j. Mercurii Sublimati 3 ℥. M. aut hujus loco Mercurii Præcipitati Albi 3j. vel 3j ℥.* which they apply upon Lint. Some make this stronger of the Sublimate; others add *Spirit. Vini 3j. vel 3ij.* In the room of the Sublimate I have frequently substituted with Success, *Mercurius Dulcis*, mixed with *Aqua Calcis*, which is a much safer Method. Digestive and balsamic Ointments are to be avoided in Cancerous Ulcers, as not only foreign to the Purpose, but extremely mischievous.

(6.) Putrid and fetid Ulcers.

VII. When Ulcers are *putrid* or *fetid*, this Circumstance arises either from the Patient's very bad Habit of Body, or from the Negligence or Unskillfulness of the Surgeon. Therefore it is the Business of the Physician to correct the Habit, by the Administration of proper internal Remedies, and of the Surgeon to clean the Ulcer frequently, especially if it is attended with intense Heat. For where Wounds are dressed and cleansed but seldom, which must frequently happen in the Army after smart Engagements, where great Numbers are wounded, it can scarce happen but that the injured Parts will be annoyed with Heat, Putrefaction, or Worms. You cannot more readily prevent these Inconveniences, than by carefully dressing the Parts with *Unguentum Digestivum cum Ægyptiaco seu Fusco WURTZII permixtum; aut Aqua Phagedænica; aut Mercurius Præcipitatus Ruber, vel solus, vel cum Alumine usto mistus, vel cum Unguento Digestivo subactus*. These Dressings are to be continued till the putrid Flesh separates and leaves the *Fundus* of the Ulcer with its own natural rosy Colour. Whilst this is doing, it will be proper to cover the Part with Lint dipped in Spirits of Wine, which is a very powerful Remedy against Putrefaction.

When

When the putrid Parts are cast off, you must proceed in Healing as you do in other Cases: But Myrrh should be particularly added to the healing Medicines, as a most excellent balsamic. The Surgeon ought always to take Care in this Case to call in a skilful Physician, who, by proper Remedies, may keep up his Patient, and preserve him from sinking before the Cure is perfected. Ulcers attended with Worms are to be treated in the same Manner: For whatever prevents Putrefaction, will destroy Worms.

VIII. Some Ulcers are so very malignant and obstinate, and notwithstanding they have no Alliance with any venereal Taint, yet they will not yield to any of the foregoing Remedies. When this happens, the only Method of Cure is, by administering mercurial Medicines, or raising a gentle Ptyalism, as I have frequently experienced. For some Men's Blood is so foul, that their Ulcers will not even be palliated, much less cured, without the Assistance of Mercury. But if they should be attended with any venereal Disorders at the same time, the Use of Mercurials will then be absolutely necessary, as we shall shew in the next Chapter.

Some Ulcers require Salivation.

CHAP. IV.

Of the Method of treating VENEREAL ULCERS^a.

I. VENEREAL Ulcers, as we have already declared, are almost always situated in the *Inguina*, after the Suppuration of venereal *Bubos*; or, in the *Prepuce*, *Frænum*, or *Glans Penis*, which is usually termed a *Chancre*: In Females they are frequently situated upon the *Vagina*, or *Labia Pudendi*. Sometimes the Nose, Palate, Lips, Fauces, Tongue, and *Uvula*; sometimes the *Os Frontis* and other Bones of the Head, and elsewhere, are subject to them. If they are neglected or ill-treated, one Ulcer of this Kind will produce an universal Pox. Therefore the principal Intention to be observed in this Case is, to expel the venereal Poison by proper Remedies, both internal and external.

Seat of Venereal Ulcers.

II. The Cure by internal Medicine, is to be performed by the Administration of purging Powders or Pills mixed with *Mercurius Dulcis*. You may also advise your Patient at intermediate Times to drink Decoctions of the Woods, or to take *Essent. Lignorum*, *Pimpinell. Alb. Succin. Tinctura Antimonii*, &c. in a proper Vehicle. These Medicines have great Efficacy, if you take them before you rise in the Morning, and encourage a moderate Sweat. A strict Regimen to be observed in Diet, is very necessary. Wine, and all vinous or spirituous Liquors, Aromatics, Spices, Salt, acrimonious or acid Things, are Poison in these Circumstances. If the Disorder has acquired so great a Degree of Inveteracy, that these Medicines are not equal to the Cure; you must have Recourse to the strongest Sudorifics, especially to strong Decoctions of the Woods: Or you may give Mercury in such Quantities as to raise a Salivation, by which you will cure both the Ulcers and the Pox which was the Cause of them.

Internal Treatment.

III. Whenever the Ulcers are situated in the Mouth, *Uvula*, Fauces, Tonsils, or Tongue, external Remedies become necessary as well as internal. The Patient should frequently use a Gargle, made *ex Decocto Lignorum, vel simplicis, vel melle*

External Treatment.

^a On this Subject read *ASTRUC De Morbis Venereis*.

Rosarum temperato. The vitiated Part should often be touched *vel Aqua viridi HARTMANII*, *vel Rosarum melle cui ad Lenem usque acorem, Spiritus Vitriolis pauxillum instillatum est*: After this it is to be healed, *per Essent. Succini et Myrrhæ*, *vel per Oleum Myrrhæ per Deliquium.* If the Ulcers appear on external Parts, it will be proper to destroy them with *Unguentum Digestivum aut Basilicon Mercurio vel vivo vel albo aut rubro præcipitato permixtum*; these Dressings are to be covered with the *Emplastrum de Ranis VIGONIS*, or with the *Diachylon cum Mercurio.* When the Ulcer is cleansed, you may dress with the Essences we advised above, or sprinkle it with the absorbent Powders we have so often recommended, (see *Chap. I. N. XV.*) but you must add a small Portion of red Præcipitate. An equal Power with the foregoing, in cleansing and healing these Ulcers, is held by the *Aqua Phagedænica, vel Aqua Calcis Mercurio dulci imprægnata.* Either of these may be applied frequently every Day, touching the Part sometimes with the *Lapis Infernalis*, or red Præcipitate. When the Ulcer is thoroughly cleansed, you may heal either after the Method recommended by HARRIS in *Dissertat. Chirurg.* that is, with a simple Ointment composed *ex Mercurio vivo cum Tereb. q. s. subactum*: Or you may use the following Formula:

℞. *Ung. Mundificativ. vel Diapompholyg. Mercur. crud. pauca Terebinthin. extinct. ana ʒj. vel ʒ ss. M. in Mortario Vitreo.*

℞. *Amalgam. Mercur. et Stanni ʒj. Bol. Armen. ʒij. Ung. Rosat. q. s. M. f. Ung.*

If at the same time you have a *Caries* of the Bone, you are to treat it with the Remedies which we shall describe below at *Chap. VIII.* particularly *cum Euphorbio vel oleo Caryophyllorum, vel Aqua Phagedænica, vel Spiritu Nitri, in quo Mercurius solutus fuerit*; or lastly, if you can do it with Safety, apply the actual Cautery. Sometimes, when these Ulcers fall upon the soft Parts of the Body, particularly on the *Inguina*, they spue out such large Quantities of Lymph, that all the Medicines you can invent, for cleansing or drying them up, will avail nothing. This is occasioned by the Rupture or Erosion of some lymphatic Vessels. In this Case, we should try what we can do by the Application of proper^a Compresses and a tight Bandage. But if these afford you no Assistance, you must call the actual Cautery in Aid, and apply it frequently, with caution, to the vitiated Parts.

IV. If venereal Ulcers of the *Penis*, or its *Glans*, are negligently treated, and universal Pox will frequently be the Consequence; the *Urethra* will often be perforated in various Places, and the Urine be discharged as through a Sieve. Sometimes the whole *Glans* and *Penis* will be eaten off, or so miserably afflicted with *Schirrhus* and^b *Cancer*, that you will be forced to extirpate them with the Knife. When the Nose is affected with these Ulcers, it is frequently demolished by them. The Disorder in this Part is called *Ozæna*, of which we shall treat more fully when we come to describe *Chirurgical Operations.* Sometimes the Palate with its Bones are so eroded and perforated, that an open Communication is made between the Mouth and Nostrils; that the fluid Part of our Aliment makes its Way out at the Nose. These Passages can scarcely ever be closed again, especially if they are large: But when the Extremities of them are healed, they may

Venereal
Ulcers at-
tended with
great Dan-
ger.

^a In this I have followed RUYSCH, *Obs. Chirurg.* 41. with Success. *Obs* 30. et DOEBEL. *Hist. Penis Cancrofi.*

^b Consult RUYSCH

be closed with a small ^a Plate of Silver or Gold. The Tonfils, the external Coat of the *Uvula*, and the whole *Uvula* are very frequently destroyed by the Virulence of these Ulcers. Decoctions of the Woods and Mercurials are the principal Antidotes to this Poison. Lastly, the *Cranium* itself, particularly on the Frontal Bone, is frequently, as I have often seen, so eroded and perforated by a *Caries*, that the Brain lays bare, and you may plainly see the Pulsations of the Arteries; from whence arise grievous Symptoms, and frequently Death, unless timely prevented by a proper Method of Cure.

C H A P. V.

Of CALLOUS ULCERS.

I. **T**HE Cure of a *Callous* Ulcer is attended with great Difficulty: To say the Truth, it will admit of no Cure till the *Callus* is extirpated. A recent Callus how to be treated. A *Calus* may be extirpated three Ways. The mildest Method which is to be used to a recent *Callus*, that is not yet become very hard, is performed by *corrosive Medicines*, and those of the mildest Kind. Amongst many others you may use *Alumen ustum*, *Præcipitat. rub.* either separately, or mixt in equal Proportions, or made up with *Unguentum digestivum*, or *Basilicon*. The *Unguentum Ægyptiacum seu Fuscum* WURTZII will answer this Intention, especially if you add a little *Præcipitatum rubrum* to it. If the *Callus* does not yield to these Applications, you may destroy it with *Lapis Infernalis* or *Butyrum Antimonii*. The same End is also well answered by the Medicine which is made by a Solution of *Argentum Vivum in Spiritu Nitri vel Aqua Forti*.

II. LE DRAN has taught us a still milder Method of destroying Callosities, LE DRAN'S Method. in *Observat. Chirurg. N. CXV. Tom. II.* which is as follows: For four or five Days he applies a Plaster, made *ex Emplastro Diachyl. cum Gummis, et Vigonis cum quadruplici Mercurio, ana*: And this he renews Morning and Night, in order to soften the *Callous* Lips in some Measure. After this he makes frequent Incisions that pass so deep as to penetrate through the whole Thickness of the *Callus*, and stops the Blood that succeeds these Incisions with dry Lint. Then he applies the same Plaster again to the Ulcer, so that it may touch the naked incised Lips. After about four Days he repeated the *Scarifications*, and this to a third or fourth Time, if it is necessary; that is, if they are not destroyed before. By this Method he affirms, that Callosities by Degrees give way, and a *Cicatrix* will succeed, without the Use of any other Remedy. I have often tried this Method, and with good Success.

III. If *Callous* Ulcers are accompanied with *Fistulæ*, then the Sinus must be laid open, before we attempt to destroy the *Callus*, as we advised above when we treated professedly on *Fistulæ*: When Fistulæ are accompanied with Callus. After this the *Callus* is to be consumed in the same Manner as we directed above. But if we shall think the Use of the Knife unsafe, or if the Patient will not admit it, it will be proper to form Tents, and daub them with *Unguentum Ægyptiacum vel Fuscum* WURTZII, and thrust them up the *Sinus*. By this Method a *Callus*, that is not of long standing may be

See Part II. Operat. on the Palate.

destroyed;

destroyed ; especially if you dip the End of the Tent in *Præcipitat. rub. Lapid. Infernal. vel Butyr. Antimonii*, before you pass it up the *Sinus* ; and continue this Method till the *Callus* is destroyed. But when you cannot reach the *Callus* with the corrosive End of the Tent, you may use the following Method. You may inject *Aqua Phagedænica*, or a Solution of *Ung. Ægyptiacum aut Fuscum WURTZII in Spiritu Vini*, up the *Sinus*, and closing the Aperture, confine it as long as you can conveniently ; repeating it as you shall see Occasion. When you have removed the *Callus*, the Ulcer may be cured in the Manner we have directed above *Chap. II.*

When the
Callus is
hard.

IV. Sometimes you will be obliged to use the Knife ; as in *callous Ulcers* or *Fistulae*, that are of long standing, and have formed Variety of *Sinuses*, where you can do nothing with corrosive Medicines : Or, where they affect and corrode the Nerves, or Veins and Arteries, and bring on violent Convulsions, or Hæmorrhages, before they affect the *Callus*. In this Case, the safest Way is to lay open the *Fistula* in the Manner we described above, (*Chap. II. N. V.*) taking great Care not to wound Nerves, Tendons, or Arteries. When you have laid open the *Sinuses* of the *Fistula*, you may presently destroy all the *Callous* Bodies, either by the Use of Corrosives, or by LE DRAN's Method, recommended at *N. II* ; healing the Ulcer afterwards in the Manner we have already advised.

How a very
bad *Callous*
Ulcer is to
be treated.

V. Lastly, if even this Method of Treatment shall not answer the desired End ; if the Patient is well stocked with Strength and Courage ; if the Situation of the Nerves and Arteries is favourable ; you may cut out all the *callous* Parts with your Knife, or destroy them with the actual Cautery. This Operation, though attended with great Pain, will bring the most obstinate *callous* Ulcer to the State of a recent Wound ; and unless a Caries, bad Habit of Body, Pox, Scurvy, Dropsy, or some other constitutional Complaint is in the Way, it may be cured by the most common Remedies. Therefore there is no Reason why we should fall into Admiration at, or doubt the Veracity of, M. A. SEVERINUS, when he affirms, that he has happily succeeded in the Cure of the most desperate Ulcers, by this Method.

C H A P. VI.

Of ULCERS supposed to be produced by MAGIC or WITCHCRAFT.

Medicine
foreign to
this Case.

I. **T**HE Remedies that PARACELSUS, HELMONT, AGRICOLA, and many others have, with great Industry, invented to cure Ulcers, which are the Effect of Magic, and always contain something unnatural in them, as Thread, Nails, Needles, are entirely useless, and therefore ridiculous and absurd. But if any are to be preferred to the rest, we should give the first Place to the following Remedies : *Folia Querneæ, aut Saligneæ, Adiantum, Hypericum, vel Fuga Dæmonum, Mercurius vivus, Asa Fætida*. These are hung round the Neck, or applied in some idle Manner, so that they can do no Mischief. Some prescribe the Ashes of a Witch that has been burnt : Others burn *Stercus Humanum*, and sprinkle the Ulcer with the Ashes. HEERIUS and HORSTIUS are high in the Commendations of *Unguentum de Visco Corylino* CARICHTERI : MYNSICHTH prescribes his *Emplastrum Fætidum*. Others, different Remedies of equal Efficacy.

II. Those Physicians who consult their own Reputation, and the Health of their miserable Patients, shall, I say, or infatuated Patients, will prescribe natural Remedies, such as are best suited to the Nature of the Ulcer, and the Patient's Habit of Body, as we have taught in the foregoing Chapters. For although we should make ever so large Concessions, concerning the Power which Devils and Sorcerers are by some supposed to have over Men, yet we should never be justified in asserting, that Disorders thus produced, were not to be treated by natural Remedies, but that we ought to have Recourse to superstitious, nasty, and ridiculous Methods of Cure. To say the Truth, those Ulcers are usually affirmed to be the Effect of Magic by unskilful and superstitious Barbers and Medicafters, which evade their Art, though at the same time they are easily to be cured by an experienced Surgeon, who can thoroughly investigate the true Cause and Nature of the Disorder. There have been, even amongst the Surgeons, ill minded Men, who have falsely affirmed Ulcers to be the Effect of Magic, in order to enhance the Price of the Cure.

What is to be done.

C H A P. VII.

The Method of treating old ULCERS, especially those that affect the LEGS.

I. **A**LTHOUGH there is scarce any Part of the Body free from inveterate and obstinate Ulcers; yet the Legs are found to be much more subject to them than the rest. As we before (*Chap. III.*) treated of malignant and inveterate Ulcers in general, we shall here only consider those which are seated in the Legs, or lower Extremities. But the general Causes of obstinate Ulcers in the Legs, are almost always the same with those of malignant Ulcers in general. For these, like the former, usually arise either from a bad Habit of Body, too great Thinness or Acrimony in the Juices; or from being attended with Callosity, and Caries of a Bone; or, lastly, from the Obstruction of some usual Evacuation, as of the Menfes in Women, or from other Causes of the like Nature. In order therefore to remedy these Ulcers, the Surgeon should give a particular Attention to their Causes, that he may be thereby led to a rational Treatment of them.

In what the Cure chiefly consists.

II. Before we enter into an Inquiry, what are the most likely Means to be used to cure these Ulcers, it will not be amiss to examine, whether they can be healed without Danger to the Patient. For we are furnished with frequent Examples, in the Writings of Physicians of the greatest Experience, where the worst of Disorders, and even Death itself, has been the Consequence of healing these Ulcers. The Answer to this Question, if I am not mistaken, is very clear, from what I have delivered above, in *Chap. I. No IX.* to wit, in Persons advanced in Years, or labouring under an infirm Habit of Body, it is most advisable not to attempt to heal them: Since they are in this Case to be looked upon rather as a Relief of Nature, than a Disorder, as they serve to drain off all noxious Humours from the Body. But I would not have this Rule extended to young robust Subjects, without some very material Reason. For in these, the first Cause of stubborn Ulcers may be removed, by Abstinence or a regular Way

Whether Ulcers in the Legs may safely be healed.

of Living, by opening Fontanells, or by proper internal Remedies, without any Danger: And the Cause being removed, the Ulcer may be healed with great Safety.

What is to be observed in general, in old Ulcers.

III. Although we have declared above, that it is improper to heal inveterate Ulcers in old Subjects; yet I am very far from affirming, that no Care at all should be taken of them. On the contrary, I think it absolutely necessary that they should be attended to. The Surgeon is to observe two things in this Case: First, to relieve the Pain, and other violent Symptoms; next, to prevent the Ulcer from spreading, and new Symptoms from coming on.

Internal Remedies.

IV. In the first Place, Abstinence and a strict Regimen in Diet is to be observed. They should abstain from Pork, from all salt or seasoned Meats, or of hard Digestion, and eat but sparingly of the most innocent Food, Gentle Purges are to be frequently repeated, to carry off the redundant Humours by Stools. Proper internal Medicines are also to be prescribed, such as are most likely to remove the Cause of the Ulcer. In Persons advanced in Years, balsamic and bitter Medicines are requisite, to temper the violent Acrimony of the Blood: As *Elixir Proprietatis, Essent. Myrrh. Essent. Succini, Essent. Balsami Peruviani*, and others.

External Remedies.

V. With regard to the external Treatment of the Ulcer, Care must be taken that it be cleansed from its Sanies, once or twice every Day. You may then dress it, either with dry Lint, or with Lint dipt in *Decoct. Fol. nucis Juglandis vel Aristolochiæ*. Over this you may lay the *Emplastrum ad Ulcera antiqua BAUHINI, Diasulphuris RULANDI, Diapompholygos, Saturninum, de Lapide Calaminari*, or any other of this Kind. These Rules being nicely complied with, if the Patient is well guarded from external Cold, and particularly from a moist or damp Air, there is no room to doubt but these Ulcers may become very mild, and convenient for the lengthening his Life. The Physicians amongst the Antients, observing the salutary Effects of Ulcers upon old Persons, thought Nature to be the best Guide, and therefore opened Fontanells in many Cases, which answer the End of Ulcers, in draining off the noxious and redundant Humours.

How Inflammation and Pain is to be treated.

VI. Whenever Inflammations and violent Pains come on, as they frequently do, either from a Blow, or Cold, or putting the Leg into cold Water; or from Passions of the Mind, or Irregularity in Diet; it will be proper in this Case, first, to take away some Blood, in plethoric Constitutions: Then to apply a Linen Compress, dipt in *Aqua Reginae Hungariæ vel Spiritu Vini Theriacali, aut Camphorato, vel & Aqua Calcis & Spiritu Vini Camphorato calidis*. The Patient should keep his Bed, and defend the injured Limb as much as possible from Cold: And in the Morning he should be ordered to drink plentifully of small Green Tea, White Wine Whey, or any other small Liquors that may be likely to promote a Sweat. By these Means the Inflammation and Pain will quickly go off. But there is great Danger, when the Patient is of a bad Habit of Body, if the Inflammation runs to a great Height, and begins to degenerate into a Gangrene. In this Case the same Remedies are to be used, both internal and external, which we prescribed above when we were treating of a Gangrene (*Book VI. Chap. XIV. No V. and the following.*) But above all, you are here to be very careful to keep up the Spirits of weak and aged Persons with proper Remedies, (particularly the Bark) and to provoke gentle breathing Sweats. If these

Rules

Rules are neglected, there is very imminent Danger that *Sphacelus* and Death will by Degrees steal upon you.

VII. When these Ulcers dry up spontaneously, in old and infirm Persons, a Horror, Nausea, and a great Weakness usually succeed, which declare Death to be at hand. (*Chap. I. N° IX.*) The first Intention is, to support the remaining Strength of Nature as much as possible by proper Diet and Medicines. There should instantly be applied to the Ulcer *Radix Gentianæ, vel Iridis Florentinæ contrita*; or if these shall be thought of too little Force, *Radix Hellebori nigri in Pulverem aut Globulos redacta*; or, lastly, *Pulvis Cantharidum, aut Globulus ex Emplastro Vesicatorio Officinarum*. These Applications will produce so great a Stimulus, that the Ulcer will frequently run again, to the great Relief of the Patient: When this happens, you must treat it as before. But when it resists all Remedy, and still continues dry, you have no Hopes of Life remaining.

How to treat Ulcers that dry up spontaneously.

C H A P. VIII.
Of C A R I E S *of the* B O N E S.

I. **T**HE *Caries* or Corruption of the Bone may very justly be esteemed one of the principal Causes of the Depravity and Inveteracy of Ulcers. For you will find it scarce practicable to heal an Ulcer, or if you do bring it to heal, it will not remain long in that State, where you have a carious Bone concealed at the Bottom.

II. We call that Disorder of the Bone a *Caries*, where the Bone, from whatsoever Cause it shall proceed, is deprived of its Covering, or *Periosteum*, and having lost its natural Heat and Colour, becomes fatty, yellow, brown, and at length, black. This is the first and lightest Degree of this Disorder, and is called by the Antients, according to CELSUS, *Lib. VIII. Cap. II. Os Vitiatum* and *Nigrities*. But the greater Degree of this Disorder is, when the Bone is eroded and eaten, and becomes uneven like a Pumice Stone, from the Number of small Holes, of which it is full; when it discharges a filthy Sanies, whose Acrimony softens, relaxes, and destroys the fleshy Parts that grow round it. This is a true *Caries*, or *Ulcer of the Bone*, and every Bone in the Body is subject to this Disorder. And although this Ulcer may sometimes appear to be very happily healed, yet, after the Cicatrix has been brought on for some time, you have an Abscess formed: The Disorder will return afresh, and the acrimonious corrupted Matter, which continually spues out from the carious Bone, being collected within, will produce various grievous Symptoms, such as Shivering, Vomiting, and Fever, and destroy the neighbouring Flesh again.

A *Caries*, what.

III. There are many Names and Species reckoned of this Disorder, and of others that bear a near Relation to it. For it is called a *Caries*,^a *Spina Ventosa* or *Spinæ Ventositas*, a Gangrene and Cancer of the Bone by^b CELSUS, sometimes by the Greek Term^c *Teredo*, and sometimes *Pædarthrocaces*^d. Though some Au-

Different Denominations.

^a We have a Treatise on the *Spina Ventosa*, by PANDOLPHINUS, an Italian, republished with the learned Notes of MERCKLINUS, Norimberg, 1674, 12mo.

^b See the Book last cited, p. 258. ^c Ibid. p. 64, 104, 143, 264. and the following.

^d M. A. SEVERINUS treats on this Subject in his Book *De Abscessibus*, and there are several *Academical Theses* on this Head, by different Authors.

thors constitute as many distinct Species of a *Caries* as we have reckoned up Names, yet I think there is not so material a Difference between them, that we should multiply them into so many separate Species. Therefore I think it best to distinguish them into two Sorts: The first where the Disorder begins in the internal Part of the Bone; the other, on the Outside, or from an external Cause. I would call this a *Caries*, and that a *Spina Ventosa*: Or when it happens in Children, I would comply with SEVERINUS, and call it *Pædarthrocaces*. But of these we shall presently treat more fully, in a particular Chapter for that Purpose, and explain their Differences more accurately.

Causæ,

IV. We find two Causes of the ^a *Caries* of the Bone. For, 1. A *Caries* arises, when the Bone is deprived of its *Periostæum*, by a Wound, Fracture, Bruise, or any other Accident, and either is exposed to the Injuries of the external Air, or is corrupted by greasy Dressings, or the common vulnerary Oils which are usually applied to simple Wounds, such as *Oleum Hyperici*, *Lilior. albor.* *Balsamum Samaritanum*, &c. Or, 2. A *Caries* arises, when the Fluids are interrupted in their Circulation, by any external Violence, or internal Cause whatsoever, from whence Inflammation and Suppuration succeed; by which the *Periostæum* and Bone suffer to such a Degree, that the Vessels which are sent to these Parts for the Nourishment and Support of the Bone and *Periostæum*, being inflamed and corrupted, the Bone is brought into consent, and soon becomes carious. This Disorder, if not quickly remedied, spreads and communicates itself to the neighbouring Parts of the Bone, making the same Progress with Ulcers in the soft Parts.

Degrees,

V. From whence it evidently appears, that there are several Degrees of Erosion or *Caries* of the Bone. The first and mildest Degree is, when the Bone is laid bare, looks greasy, and turns yellowish. But as soon as it becomes truly yellow, brown, or black, the incipient *Caries* degenerates into a worse State. The third Degree is, when the Bone becomes uneven, rough, and rotten. The greater Erosion the Bones have suffered, the more rough and uneven will they appear. When the *Cranium* is perforated through both Tables, or the *Tibia* or *Femur* are eaten through to the *Medulla*, this is a *Caries* of a very bad Kind. But the worst Kind of *Caries*, where indeed the Case may almost be pronounced desperate, is, that which falls upon the Joints, or any Parts of the Bones that lie deep: Because you can have no Access to it with your Hands, to clean the Bone, and the Case admits of no Remedy but Amputation of the Limb.

Diagnosis,

VI. A *Caries* may be discovered two Ways; as it is concealed, or as the diseased Bones are exposed to View. 1. When the Bones lie open to the Sight, the *Caries* discovers itself by the following Signs: The Bone looks greasy, and degenerates from its natural Colour, to yellow, brown, or black; it is bare, and the *Periostæum* destroyed. If you apply your Finger or Probe to the Bone, it will discover itself to be rough, uneven, and spongy. 2. But where the Bone is covered with Flesh, it will then discover itself by the following Signs: The Matter that flows from it will appear greasy, brown, or blackish, and stink like rank Lard. When you take off the Dressings, they will be tinged with a blackish Hue, from the Colour of the Discharge: When you have room to pass your Probe to the Bone (which is not always the Case) you will find it to be rough.

^a HAYNE, in his Book *De Ossium Morbis*, treats ingeniously on the Formation and Causes of a *Caries*.

and uneven. The neighbouring Flesh will appear flaccid, soft, loose, spongy, and stink like rank Lard. Lastly, in Cases where you can neither see the Bone, nor get at it with your Probe, you may very reasonably suspect it a foul Bone, when the Ulcer frequently breaks out afresh, after it has been healed, without any other manifest Cause; and especially if any Fragments of Bone are discharged from it.

VII. From what has been laid down, it plainly appears, what Dangers the *Prognosis* *Caries* is attended with, and what Event we may expect from each different Degree of it. Ulcers of this Kind give great Trouble in healing: They are very apt to spread, especially where we cannot conveniently come at the *Caries* to destroy it: And when they are healed, they frequently break out again, as was just observed. Where the Disorder increases, and extends itself to the Joints, particularly to the Knee, there is scarce any Remedy, but Amputation of the Limb. Where the Circumstances are such, that it shall not be thought advisable to take off the Limb, the Patient is followed with great Weakness and a feverish Disorder, and by Degrees, with Death. *Caries* in the *Femur*, *Coccyx*, *Os Sacrum*, *Carpus*, *Tarsus*, and *Ossa Palati*, meet with extreme Difficulty in the Cure. When the *Cranium* is affected with this Disorder, it is frequently eat through even to the *Dura Mater*: From whence proceed acute Pains of the Head, great Watchfulness, Vertigo, a disturbed Imagination, and many other Disorders of that Kind, with great Danger of Death.

VIII. With regard to the Cure of a *Caries*, many Methods have been attempted. ^{Cure 1. By} The first and mildest Method is applied to the slightest Degree of a *Caries*, and is performed by the Application of Spirituous Remedies; such as *Spiritus Vini*, or *Aqua Reginae Hungariae*: With which Applications alone I have cured slight *Caries*. Or by Balsamics, such as *Pulv. Aristolochiae*, *atque Iridis Florentinae*, *vel Pulv. Myrrhae atque Aloës*. One of these Powders is to be sprinkled upon the Part, after you have diligently wiped away the Sanies with dry Lint: This Method is to be continued till the diseased Part of the Bone is cast off, and new sound Flesh springs up in its stead. In a *Caries* that penetrates somewhat deeper, stronger Remedies take place: Such as ² *Pulv. Euphorbii*, *vel Essentia Euphorbii*, *cum Spiritu Vini optimo parato*, *vel Oleum Coryophyllorum Cinnamomi aut Ligni Guaiaci*. These may be applied with a Pencil, or spread upon Lint, and laid on the Part affected. Others apply corrosive Medicines, as the *Aqua Phagedaenica*, *aut Spiritus Vitrioli aut Sulphuris*, and with the same Success. In the room of all these, you may very well substitute, *Solutio Mercurii in Aqua Forti vel Spiritu Nitri*. We have enumerated these as the Principal, from a great many other Remedies of the like Nature, that have been prescribed for the same End. We purposely pass by such as are either too weak for the Intention, or too vehement to be admitted with Safety: Such as *Arsenicum vel Mercurius Sublimatus* in Substance. When you have procured an Exfoliation of the diseased Part of the Bone, your Business is, to complete the Cure with Balsamics: Therefore the next Dressings to take place, are, *Aqua Reginae Hungar* *Essentia Mastich. Myrrhae, Succini, Aloës, Aristolochiae, Balsamum Peruvianum vel Capivi*, or any Balsam of this Kind: Cover these with a Plaster, and proceed after-

^a The Antients used the Cautery or Rasp in the slightest Cases, as you may see in CELSUS, *Lib. VIII. Cap. II.* but at present we never use these violent Methods, but in desperate Cases.

^b This is highly extolled by many. See MERCKLINI *Lib. De Spinae ventositate*, p. 473.

wards as you are directed above in the Cure of Ulcers in general (*Chap. I. N^o II. and the following.*) Le DRAN has given us Observations on *Caries* of the Bones very well worth our remarking: Particularly on a *Caries* of the Cubit, *Obs.* 51, 52, 53. in the Loins, *Obs.* 69. after the Small Pox, *Obs.* 70. in the *Os Ilium*, *Obs.* 95. in the *Trochanter major*, *Obs.* 97. in the Knee, *Obs.* 102, 103. and in the *Tibia*, *Obs.* 104.

2. by the
Trepan.

IX. A Second Method of Cure for a greater Degree of *Caries*, consists in^a perforating the Bone after it is laid bare, with the Trepan or Instrument described in *Plate VII. Fig. 2. or Fig. 7. A. or Plate XV. Fig. 8.* in the same Manner, as we advised in another Place to be done with the *Cranium*, after it had been laid bare by a Wound. *Book I. Chap. XIV. N^o 17.* After this is done, the Part is to be dressed either with dry Lint, or with the Balsamic Medicines which we have recommended above. By these Means the Exfoliation of the foul Bone is forwarded, and new Vessels push through the Foraminula that you have made, which joining with the neighbouring Flesh, make a new Covering for the Bone.

3. By the
Raspatory
or Chissel.

X. The third Method of Cure is performed by scraping away the discoloured or vitiated Part of the Bone, with a *Raspatory* or Chissel (*Plate VII. Fig. 3, 4, 5.*) till all the corrupted Parts being destroyed, the Bone appears white or ruddy and sound. CELSUS advises this Operation of rasping the Bone, to be done boldly and expeditiously. SCULTETUS is of Opinion^b, that you should never begin to scrape, till the Bone lies fairly exposed, or rather not till it begins to separate from the sound Parts; and that you should dress the Part with nothing but dry Lint, till this happens: But this Rule is not constantly to be observed. Others in particular Cases use a Chissel and Mallet, (*Plate VII. Fig. 10, 11.*) by the Assistance of which, they strike off the corrupted Parts from the sound. But both these Methods, N^o IX, and X. have been pretty much neglected by the modern Surgeons. Though PETIT affirms, in his *Book de Morbis Ossium*, when he is treating of a *Caries*, that where you have fungous Flesh continually sprouting up, the best Method is, to rasp the Bone, and afterwards to use the Cautery. In certain Tumors of the Bone, which are called by us *Spinæ ventosæ*, which refuse to yield to any medical Application, he advises not only to make frequent Perforations, but to take off the Tumors with the Chissel and Mallet. But we shall treat of this Case in the following Chapter.

4. By the
Cautery.

XI. The fourth, which is the most antient, ready, and certain Method of Cure, especially in the greater Degrees of this Disorder, is performed by burning down the vitiated Part of the Bone with the actual Cautery. See different Sizes and Figures of Cauteries in *Plate III.* Great Care must be taken in performing this Operation, that you do not injure the Flesh or other soft Parts that lie near. To prevent Mischief of this Kind, your Assistant should keep back the Lips of the Ulcer with his Hands: If the Opening is too narrow, it should be enlarged with a sponge Tent, or widened by the Knife, till the Bone lies fair. The Bone itself should be well cleansed with dry Lint: And if there is any fungous Flew, it should be removed before you go to work with your Cautery. One Application of the Cautery will seldom be sufficient for your Purpose, where the *Caries* is considerable: It must be frequently repeated, at longer or shorter Intervals as you shall think proper. If the *Caries* has spread itself

^a See the Method of perforating, by CELSUS, *Lib. VIII. Cap. ii, and iii.*

^b In *Armament. Chirurg.* pag. 42.

so wide, that you cannot destroy it with one Cautery, the first Iron should be applied to the Middle of it, proceeding afterwards to its Lips. This Operation is not attended with great Pain, if you take Care not to hurt the soft Parts: For the Bones have no Sense of Pain. ^a When the Bones of the *Cranium* are become carious, a cautious Surgeon will never risque his Reputation on this Operation, from the apparent Danger there is of injuring the Membranes of the Brain, or the Brain itself. The same Caution may be observed in some other soft and spongy Bones, as in the *Sternum*, or a carious *Rib*, where for the like Reasons the Cautery is to be avoided. The *Carpus* and *Tarsus* will not well admit of cauterising, and other spongy Bones of this Kind: And that more particularly from the Neighbourhood of the Tendons and Ligaments, which will necessarily be in great Danger of suffering.

XII. When you have cauterised the Parts in the Manner I have described, you should dress at first with dry Lint: But if the Patient complains of a Sense of Heat in the Part, you should moisten your Lint *cum Spiritu Vini*. You may afterwards dress with Balsamics, such as we described above at N. VIII. till the Exfoliation succeeds: And the Vacuity will shortly be filled up with new sound Flesh, which will be a Testimony of the Recovery of the Part. But where it happens otherwise, and the Bone is left bare, uncovered with Flesh; or if the Flesh with which it is covered, is soft and spongy, and does not adhere sufficiently to the subjacent Bone; or where the Bone remains discoloured; in either of these Cases, your original Disorder is not extirpated. In these Circumstances your Work is to be done over again, the spongy Flesh must be removed, either with the Knife or Cathæretics, such as the *Alumen ustum et Mercurius præcipitatus ruber*, or stronger, if they shall be found necessary: And the actual Cautery must be again called for, or you cannot expect your Cure to stand.

XIII. When the *Caries* penetrates even to the *Medulla* in the larger Bones, ^b PETIT advises us, after the Example of ^c MEEKREMIUS, to make a Perforation, or two, or more, in the Bone with the Trepan; and furnishes us with an Instance where he made three Perforations in this Manner, in the *Tibia*, after he had tried the Cautery, and was justified by Success. But this Method can scarcely be put in Practice upon any other great Bone than the *Tibia*, because you will be obstructed by the great Quantities of muscular Flesh which you will meet with. He further informs us, that the *Os Pectoris* or *Sternum* may be perforated in this Manner, to make a Passage for the Discharge of Matter, which is sometimes confined under it; and to make Way also for the immediate Application of Medicines to the disordered Parts. But the Performance of this Operation on the *Sternum* requires the greatest Caution and Deliberation: Because Respiration may be injured by it, or other grievous Disorders may be produced. It is to be observed in this Place, that the *Caries* of the Bone which penetrates to the *Medulla*, or begins in the *Medulla* (which we term the *Spina Ventosa*) does not always arise from an internal Cause, but frequently from an external Violence; by which the Vessels which are distributed on the internal Part of the Bone are burst, and Blood extravasated. This by its Stagnation in the Cavity quickly forms *Pus*, erodes the Bones, and produces a *Caries*, which extends itself from the *Medulla* to the external Parts.

What is to be done after cauterising.

When a Caries penetrates to the *Medulla*, the Trepan is sometimes necessary.

^a CÆLSEUS has given the same Caution, *Lib. VIII. Cap. ii. de Carie.* ^c *Obs. Med. Chirurg. 72. edit. Latinæ, &c. 69 Belgicæ.*

^b *Lib. de Morb. Ossium, cap.*

Admonitions of
CELSUS.

XIV. When the Blackness or Caries extends to the other Side of the Bone; so that the whole Bone seems to be corrupted, CELSUS advises to take it entirely out, *Lib. VIII. Cap. 2. 3.* If the lower Part remains sound, you must remove only as much as is corrupted. If a Bone of the *Cranium*, or the *Os Pectoris*, or one of the *Costæ* is carious, the Cautery is not to be used, but it must be cut out. And in this no Delay is to be suffered, but you are to take it out the Instant you have laid it bare, before any inflammatory Symptoms come on, by which means you will do it with greater Safety. When a Cartilage is become carious, you must pare off the carious Parts with your Knife, according to CELSUS; to whom I am obliged for this Section, not having met with any modern Surgeon, who has treated so well on this Subject.

In what the
Cure of a
Caries consists.

XV. Upon a diligent Attention to what has been delivered, we may very reasonably conclude, that the principal Business in curing a Caries of the Bone, consists in a speedy Extirpation of the carious Parts of the Bone. This is done in very slight Cases by the Application of *Spiritus Vini*, or *Aqua Regiæ Hungariæ*; in Cases of more Consequence, by a Solution of *Argentum Vivum in Aqua Forti*: But in Cases of the last Consequence, by the Cautery or Knife. The rest of the Cure is performed in the same Manner as other Ulcers are treated, by the balsamic Remedies which we have so often recommended.

How Bones
that are very
rotten are
to be treated.

XVI. Where the Bone is exceeding rotten, or where the Disorder has communicated itself to the Joint, for Instance to the Knee, or to any Joint of the Arm or Leg, so that the vitiated Part cannot be extirpated, and the rest of the Limb preserved; you have only one Remedy left, and that a melancholy one, which is the Amputation of the diseased Limb. Otherwise your Patient will drag on a miserable Life: Yet at last perhaps worn down with Pain and Weakness, attended with a long Train of grievous Symptoms, he must yield to Death^a. In the large Bones, where the whole Bone is not carious, but only Part of it, as the external Part of the *Maxilla*, *Os Humeri*, *Tibia*, or *Clavicle*; or any Part of the *Rib*, *Ulna*, *Radius*, or *Fibula*, &c. you must not immediately proceed to the Amputation of the Limb, but only remove, in the most convenient Manner you can, either by medicinal Applications, or by the actual Cautery, the diseased Part of the Bone, dressing afterwards as we taught above at *Sect. XII.* till the Bone is covered with sound Flesh, and the Ulcer healed. Sometimes Part of the vitiated Bone separates spontaneously from the rest of the Bone. If you can lay hold of it, and the Ulcer is wide enough, you should remove it with your Fingers or the Forceps: If the Ulcer is not wide enough to admit of this, you must enlarge it with your Knife. You will meet with a remarkable Case of this Kind in MEEKREM. *Observ. Chirurgic.* 66. *Edition. Belgic. et Observ.* 69. *edit. Latinæ*, where a large Portion of foul Bone separated and cast off from the Arm: And another in RUYSCH. *Observat.* p. 94. *ac The-saur. Anatomic*, VIII. *Tab. III.* where the same Case happened in the *Tibia*.

^a LE DRAN gives us several Instances of an Amputation in a Caries; particularly *Obs.* 101, 102, 103, 104. But many of these Patients died, for the Reasons just mentioned.

C H A P. XI.

Of the SPINA VENTOSA, PÆDARTHROCACES, and EXOSTOSIS, which may be called TUMORS OF THE BONES.

I. THAT Species of Corruption of the Bones, which takes its Rise in their internal Parts, and by Degrees enlarges the Bone, and raises it into a Tumor, is at this Time called, by Physicians and Surgeons, a *Spina Ventosa*, by some a *Spina Ventositas*: Though the Antients were entire Strangers to these Terms, and distinguished them by the Names of *Sideratio*, *Gangræna*, or *Cancer Ossis*, or sometimes by the Word *Teredo*. Some amongst the French call it an *Exostosis*^b. Though this Term more properly belongs to certain Eminencies or preternatural acuminate Excrecences in the Bones, which happen after a Fracture or other Accident, and are sometimes accompanied with a *Caries*, yet I have frequently seen this Case of the Bones, and have now Bones of this Kind in my Collection, where there is not the least Appearance of *Caries*. This Disorder seems to have borrowed the Term *Spina* from the Resemblance which the Eminences of the Bone in this Case bear to Thorns, continually pricking the Flesh, and producing grievous Pains: And the Epithet *Ventosa* is added, because the Tumor appears upon touching to be filled with Wind or Air, though in Fact it is never, or very seldom distended with Air. Afterwards several Writers, and particularly PANDOLPHINUS, barbarously distorted the Word into *Spina Ventositas*.

Spina Ventosa, what.

II. When this Disorder happens to Children, many, with M. A. SEVERINUS, call it a *Pædarthrocaces*, from the Greek Words *παις* a Child; *αρθρον*, a Joint, and *κακος* an Evil: To signify that this Disorder is most frequently found in the Joints of Children: For as the Bones of Children are softer and more spongy than the Bones of Adults and old Persons, they are therefore so much the easier distended by Humours, and more frequently form Tumors. SEVERINUS made another Distinction between the *Spina Ventosa* and *Pædarthrocaces*. For some of these Tumors which we call *Spina Ventosa*, are very painful, frequently look red, and have all the Appearances of Inflammation: Others are free from Pain (at least in any considerable Degree) in the Beginning, particularly in rickety Children, and these he called *Pædarthrocaces*. But at present these Names are pretty much confounded, and are deservedly, as MERCKLINUS has taught us, used for one and the same Disorder; only with this Difference, that this Disorder in Children begins with little or no Pain, but is almost always attended with Pain in its Progress.

Pædarthrocaces, what.

^a By the Arabians, witness Jos. PANDOLPHINUS, *Lib. de Ventositate Spinæ*.

^b See MERCKLINUS, Annotations on PANDOLPHINUS, and what we said above at Sect. III.

^c See GORÆUS in *Definit.* Jo. A. VIGO in *Chirurg.* and PETIT *Lib. de Morb. Ossium, cap. de Exostosi & Carie*.

^d MERCKLINUS relates a Case of this Kind, where, upon opening a Tumor, nothing was discharged but a Flatus, and the Patient died.

^e See M. A. SEVERINUS's Book *de Pædarthrocace*, contained in his excellent Work *De reconditâ abscessuum naturâ*; also the academic Theses of AMMANNUS, TANSIUS, MÆBIUS, CHUNIUS, and others.

^f Cases of this Sort may be seen in M. A. SEVERINUS *de Abscess.* p. 144. and p. 467. RUYSH. *Epistol. Anatomic.* XIV. BIDLOO *Exercitat. Exostosi*.

^g *Lib. de Spina Ventositate*, p. 53, 54, 248, et seq.

Symptoms.

III. There are other Names of a *Caries*, which we have recited above *Seet. I.* and in the foregoing Chapter *Seet. III.* which agree much better with this Disease of the *Spina Ventosa*, than with that Disorder, which is vulgarly and strictly speaking called a *Caries*; as *Cancer Ossis*, *Gangraena*, *Sphacelus Ossis*, which Terms are frequently used by the Translators of HIPPOCRATES; and the Greek Word ^a Τερεδων, which they translate *Teredo*, from the Similitude of those Worms which are called *Teredines*, which eat into and destroy Wood. It is very probable, that these are all synonymous Words for the *Spina Ventosa*, different perhaps only in Degree: But I shall spend no Time in Defence of this Opinion, because MERCKLINUS, in my Judgment, has sufficiently demonstrated not only this, but that the Disease itself was well known by the ^b Antients, contrary to the ^c Opinion of some. Whoever desires farther Satisfaction upon this Head, may turn to this Writer's Notes on PANDOLPHINUS's Book, which we have so often quoted. Lastly, we must observe in this Place, that PETIT, in his Book *De Ossium Morbis*, Chap. XVI. ranks all these Names and Diseases under the Name of *Exostosis*, and at the same time entirely neglects to mention the other Names, which are more vulgarly known, and in constant Use amongst medical Writers. Whether he has judged well in this Case, I leave others to determine. For my own Part, I shall chiefly use the Term *Spina Ventosa*, as the most received Name amongst us at this Time.

Differences.

IV. But these Disorders, particularly their *Differences* and *Degrees*, are, in my Opinion, not described with sufficient Accuracy by most Writers. I intend to describe them as clearly as I can; for great Numbers of these Cases have fallen under my Care: And nothing can tend more to an Improvement in the Method of treating these Disorders, than an accurate Knowledge of their Differences. A *Spina Ventosa* is by us understood to be a Corruption and Erosion, or *Caries* of the Bone, occasioned by a Depravity of the contained Fluids, and arising generally spontaneously, without any external Cause, beginning, not upon the external Face of the Bone, but between its *Lamellae* or *Cells*, or in its internal Cavity; and extending itself, by Degrees, to the external Parts, at length affects either the ^d whole Bone, or a ^e greater or smaller Part of it, expanding it to a greater Width, or raising it into a Tumor. (*See Plate XII. Fig. 16. A. B.*) It is frequently hard, and sometimes without Pain; at other Times it appears as if it was filled with Wind, and is attended with a greater or less Degree of Pain, pricking, shooting, at last it grows red, and is attended with other bad Symptoms; till the disordered Bone being, by Degrees, corroded, the common Integuments, and other soft Parts that lay over it, remaining at first entire, but at last partaking of the Disorder, foul Ulcers of the most stubborn Sort break out. When Tumors of the Bone are hard, and the soft Parts not inflated, and are free from Redness, Inflammation, and Pain, as is frequently the Case in rickety Subjects, in this Case they are not attended with such bad Symptoms as we have described above. SEVERINUS has given the Name of *Pædarthroacæ* to these Tumors, as we have already observed, because this Case chiefly happens to

^a See GORÆI, *definitiones sub hoc vocabulo Τερεδων* Pag. 52, 63, 257, et seq.

^b HEYNE was of this Opinion, *Lib. citat.* p. 62. He affirms, that this Disease was not known till the Appearance of the *Lues Gallica*.

^d This happens to the small Bones, such as the Bones of the Fingers, *Carpus*, or *Tarsus*.

^e This to the larger Bones, such as the *Ossa Cranii*, *Tibiae*, *Femoris*, aut *Brachii*.

Children,

Children; and in order also to distinguish it from the *Spina Ventosa* of the *Arabians*: But the painful, red, inflated Tumors that happen equally to Children and Adults, are called *Spina Ventosa*. *Cancer vel Gangræna Ossis, aut Teredines*. By an *Exostosis* I mean a preternatural Eminence of the Bone, which is somewhat acute, or if you please, an Excrescence of the Bone, whether it is attended with Erosion or not. A *Spina Ventosa* differs from a *Caries*, by being accompanied with Tumor; and is to be distinguished from the *Rickets*, because rickety Subjects are attended with various deformed Tumors on the *Epiphyses* of the Bones, without Pain or Erosion.

V. Each of these Disorders generally begin about the Heads or *Epiphyses* of the larger Bones, where they are most tender and spongy, and where the noxious Matter may not only have sufficient room to lodge in the cellular Substance, but where it will also meet with the least Resistance in softening and expanding the Parts. Nevertheless, I have sometimes seen this Disorder arise in the Middle of these Bones, between their *Lamellæ*, especially in the *Tibia*. *Tophi*, and *Venereal Gummata*, as they are called, which arise in the *Os Frontis*, and on other Parts of the *Cranium*, and frequently on other Bones, particularly on the *Tibia*, may all be ranked under this Class, as they owe their Origin to an internal Cause, and are only distinguished from the others by being particularly painful in the Night. Yet we sometimes see this Kind of Tumor in very chaste Persons, and where there is nothing venereal in the Case. Thus you see the *Spina Ventosa* is not confined to the Bones of the Extremities, but seizes even upon the Bones of the Head, Face, Neck, and Breast: Though the Bones of the Arms, Legs, Fingers, *Carpus* and *Metacarpus*, *Tarsus* and *Metatarsus*, are more frequently the Subjects of this Disorder. You may see various Cases of this Kind in MERCKLINUS's Notes on PANDOLPHINUS, p. 227, et seq.

VI. They arise generally, as we have declared above, from internal Causes, from acrimonious, scorbutical, rickety, or variolous Humours. But principally from a venereal Taint; for they were not so frequently^d observed in *Europe* before the Appearance of the venereal Disease. In the mean time it is reasonable to suppose, nor is it contradicted by Observations, that this Disorder may sometimes owe its Rise to external Causes, especially in Persons constitutionally disposed to these Disorders: When, for Instance, the Vessels between the *Lamellæ* of the Bone, or in the *Medulla* itself, are, by a Blow, Fall, or any other external Violence, injured or torn, and the Fluids extravasated. By Degrees they putrify, corrupt and destroy the *Medulla*, and soften and corrode the Substance of the Bone: Whence proceed Pains, Tumors, Ulcers, and *Fistula* of Bones and the adjacent Parts, and all the same Mischief which is usual to arise from internal Causes.

^a Vid. CELSUS L. viii. C. 10. TULPIUS *Obs. Med.* L. iv. C. 12.

^b I have dissected several, who died of this Disorder; and in some I found the Bones softer than a Cartilage.

^c HILDANUS gives you Instances of this Kind, *Cent. 4. Obs. 95, 96.*

^d Some are of Opinion, that this Disorder was absolutely unknown till the Appearance of the Venereal Disease; as HEYNE, in *Lib. de Morb. Oss.* p. 62. but MERCKLINUS, in his Notes on PANDOLPHINUS, *Cap. I.* has plainly evinced the contrary, and shewn that it was known to HIPPOCRATES, GALEN, CELSUS, and others, who have described it under the Names of *Sideratio*, *Gangræna*, *Cancer Ossis*, &c. which are only different Names for the same Thing.

^e See an Instance of this in HEYNE, *De Morb. Oss.* N. 29.

Proximate
Causes.

VII. The Proximate Cause of this Disorder is either a Collection or Congestion of a viscid and thick, or of an acrimonious and corroding Humour; or an Inflammation arising in the *Medulla*, or in the Substance or Cells of the Bone, degenerating into an Abscess, and forming *Ichor* or *Pus*. As these stagnating Fluids can find no Discharge from the Bones, especially from their Cavities, they are confined there, till they putrify and become acrimonious, corrode and destroy the neighbouring Parts, converting them, particularly the *Medulla*, into a like Kind of Sanies; at length they attack the Bone, and destroy that. The Collection of viscid and pituitary Fluids, with the Expansion of the Bones, sometimes happens without Pain, as in the *Pædarthrocaces*^a. But the Erosion of the Parts can never happen without the most acute Pains, proceeding, as we say, from the inmost Marrow. But in the Beginning of this Disorder, when the Mischief is only in the internal Part of the Bone, the Pain does not increase upon external Pressure: When the Pain increases upon Pressure, the external Parts are brought into Consent. When this happens, the *Periosteum* and Parts that surround it, with the Substance of the Bone and the *Tunica cellularis* enlarge; from whence a Sensation frequently arises, as if the Parts were filled with Air or Wind, and the Disorder was hence called *Ventosa Spina*. But when the Tumor is opened, either spontaneously or by the Knife, if the Bone lays bare, you will frequently find it full of small Erosions, resembling a Sponge or Pumice Stone, as it is in a *Caries*. From what has been here delivered, you may learn the near Resemblance that these two Disorders bear to each other, their Signs, and at the same Time some material Differences by which they are to be distinguished.

Degrees of
a *Spina*
Ventosa.

VIII. A *Spina Ventosa*, strictly so called, may very properly be divided into three Degrees. The first is, when the Patient complains of a continual grievous Pain in the Bone, which seems to him to proceed from the *Medulla*, and torments him so that he can have no Sleep. At this Time there is no external Pain or Tumor. In this State the Disease is confined to the internal Part of the Bone. The second Degree of the Disease is, when after these Pains a red Swelling appears upon the Face of the Bone, either hard, or soft, and as it were windy, with external Pain more or less. The third Degree is, when after all the former Symptoms, an Abscess is formed in the Tumor, which either bursts spontaneously, or is opened with the Knife, and discharges a fetid *Ichor*, or purulent Matter, smelling like rank Butter or Lard; and afterwards maintains this Discharge in greater or smaller Quantities, like a carious Ulcer, and creates, what the Antients usually called an Ulcer with *Caries* of the Bone. This Species of the Disorder may be called an *Inveterate Spina Ventosa*: The other a *recent* or *incipient* one.

Pædarthro-
caces.

IX. A *Pædarthrocaces* begins with an Enlargement of the Bone, and generally without any Pain or external Cause: But in its Progress it is frequently attended with Pain and Inflammation, and at length with Abscess, Ulcers, *Caries*, as in the *Spina Ventosa*, especially about the Joints and Extremities of the Bones; and in short is attended with the same Symptoms with the *Caries* and *Spina Ventosa*. From whence it is evident, that the *Pædarthrocaces* may in some Measure

^a MERCKLINUS thinks this cannot happen without Pain, but SEVERINUS and I have often seen it.

be looked upon as a distinct Disease, in the Beginning; but if it is not presently relieved, it will at length become a perfect *Spina Ventosa*, differing from the other in nothing but Degree.

X. From considering what has been already delivered, especially what has been taught in the preceding Chapter at *Seçt. VII.* concerning the *Prognosis* of a *Caries*, it will be no difficult Matter to form a *Prognosis* of what we are to expect in the Course of Disorders of this Kind. For as it is manifest, that corrupted acrimonious Matter, when it is confined in the Cavity of a Bone, or included in its *Lamellæ* or Cells, cannot be easily discharged, either by Nature or Art; it necessarily follows, that it will, by Degrees, corrupt and destroy the Parts that lay near it; till at length the Bone itself, if a timely Remedy is not applied, will be entirely corrupted and destroyed, so as to make it necessary to take off the whole Limb in order to save the Life of the Patient. Nay, what is still worse, if this Disorder arises from a vitiated State of the Blood, when you have taken off one Limb which shall have been affected in this Manner, you shall have it return with equal Fury in another; in the same Manner as it happens in cancerous Cases: Though this is not constantly the Case, especially if you correct this State of the Blood by proper Remedies, and by enjoining a strict Regularity with regard to Diet. In the *Pædarthrocaces*, and frequently in the two first Stages of the *Spina Ventosa*, the Disorder is happily cured by the Administration of proper Remedies. But the Cure will be attended with greater or less Difficulty, in Proportion to the Inveteracy of the Disorder, the Progress it has already made, the Strength of the Patient, the Degree of Corruption in the Blood, the Number and Violence of other Symptoms that accompany it; nay, sometimes it will be plainly incurable, unless you proceed to Amputation; and the Strength of the Patient being exhausted, he dies tabid.

XI. There are two Methods of treating a *Spina Ventosa*. One is suited to the two Degrees of the Disorder, which we described above, as the milder State: The other to the most violent or third Degree, when the Bones, with the Parts surrounding them, are entirely corroded and destroyed. The best Method that ever I could find for treating the slighter Degrees of this Disorder, is the following. (1.) If the Patient is an Adult, endeavour to correct the Acrimony of his Blood, by prescribing him a Decoction of the Woods, *sc. ex Rad. Sarsaparillæ, Chinæ, Scorzonæræ, Ligno Sassafras, Guaiaci, Juniperi*. Let him drink largely of this every Morning in Bed, as warm as you usually drink Tea or Coffee, giving him from eight Ounces to twelve Ounces at a Time, according to his Strength. In the first Draught let him take *Essent. Lignorum, vel Pimpinell. ad Grs. 50. vel 60.* or some other Drops of the same Intension, endeavouring to raise a gentle Sweat. These Medicines will penetrate into the finest Vessels, and even into the bony Fibres, and drive out the noxious Humours, or correct them, greatly promoting the Digestion and Dispersion of stagnating Fluids and Tumors. (2.) This Intension will be greatly forwarded by fumigating the affected Parts with the Steam from Decoctions of resolving or aromatic Herbs. (3.) In the intermediate Times let the Part be rubbed twice in a Day with *Unguentum Mercuriale*, covering it afterwards with the *Emplastrum Mercuriale*. (4.) At the same Time it will be proper to prescribe mercurial Remedies internally, to weak Persons but once, to robust Habits oftner, so as to raise a gentle Salivation: This must be put in Practice, or omitted, according to the Degree

Degree of the Disorder, and the Strength of the Patient. I am fully satisfied by Experience, that no Good is to be done in this Case without the Assistance of mercurial Remedies, which makes it very suspicious that this Disorder proceeds from a venereal Taint, or has something very near a-kin for its Cause. By diligently pursuing this Course for several Weeks (for it will not presently gain ground) the first and even second Stage of this Disease, where you have bony Tumors formed, may be cured, and the Tumors dispersed, or at least brought to that State, that they will not increase, but remain as they are, without bringing on any Pain, or other remarkable Inconveniency. This I have frequently seen, where I could by no Means disperse them: Especially where the Patient is regular and moderate in his Diet, living upon soft Broths instead of solid Meats, and drinking the small Runnings of the aforementioned Decoction for his common Drink; or, instead of that, the *Decoction Cornu Cervi, Hordei, Avenæ*, or any other thin aqueous Liquors.

Cure of the
Pædarthro-
caces.

XII. The same Method must be used in treating the *Pædarthrocaces*, whether attended with Pain or not; giving frequently, at proper Intervals, gently opening Medicines with small Quantities of *Mercurius Dulcis*. If this Disorder is accompanied with the Rickets, you must administer Medicines adapted to this Complaint, and advise frequent Exercise.

Cure of a
bad *Spina*
Ventosa.

XIII. If either of these Disorders should be so far advanced, as to be out of the reach of the Remedies we have already advised; if the Pain and bony Tumors increase, Abscesses are forming, and you have great Reason to fear the entire Destruction of the Bone; if the Abscess does not burst of itself, you must not stay for its Maturation, but lay the Bone bare with your Knife in the most proper Place, which is generally the most painful, and descending Part, or where it is already burst. If the Opening is too narrow, you must enlarge it; if your Patient dreads the Knife, make your Opening with a Caustic, and afterwards make several ^a small *Foramina* in the Bone with the small Piercer, *Plate VII. Fig. 2. or Fig. 7. A. or Plate XIV. Fig. 8.* You must pierce down to the Medulla, that there may be room for a Discharge of the confined Matter. But where these *Foramina* are not sufficient for the Discharge, you must apply a larger Piercer, which they call the Trepan ^b, if the Bone will admit of it with Safety; which will not only make greater room for the Discharge of the corrupted Matter, but you will also be able to apply your Medicines more conveniently to the Part. Whilst you are proceeding in this manner, you must insist upon the internal Use of the Essence and Decoction of the Woods, with antimonial and mild mercurial Medicines: Externally you must treat the Ulcer with cleansing and balsamic Applications, such as *Decoctum Agrimon. Saniculæ, Hyperici vel Aristolochiæ, cum Melle Rosar. & Essent. Myrrhæ ac Aloes*, which should be injected with a Syringe twice every Day; or a Solution of *Mercurius Dulcis in Aquâ Plantag. vel. Aquâ Calcis*. Afterwards you may dress with the Essences we have just mentioned, or *cum Essent. Mastichis aut Succini*, spread upon Lint, covering all with a mercurial Plaster, or with any other that you shall think more convenient. This Method is to be continued till the Parts

^a This has been advised by CELSUS, PAREUS, SEVERINUS, SENNERTUS, MARCHETTUS. See MERCKLINI Not. p. 483, seq.

^b CELSUS has recommended this Method, *Lib. viii. Cap. 2 & 3*, and HEYNE, *Lib. de Off. Morb. p. 68.* and PETIT, *Lib. de Morb. Off. Cap. de Exostosi*: And BOERHAAVE, in *Aphorism. practic.*

heal.

heal. Sometimes the actual Cautey may be used to Advantage in this Case, to root out the Disorder, especially when it is only between the *Lamellæ* of the Bone. Rasping or Scraping seems to me to be much better suited to the *Caries* of the Bone, than to the *Spina Ventosa*.

XIV. But when Things are still worse, and all the Remedies we have hitherto recommended are of no Effect; when the Part is already too much corroded and destroyed, so that there are no Hopes left of saving it, or indeed of saving the Patient, but by amputating the diseased Part; you must determine on the Operation, which is to be considered in two Lights, according to the Difference of the Parts affected. i. When the Disorder is situated on the small Bones, as on the *Carpus*, *Tarsus*, *Metacarpus*, or *Metatarsus*, or even on the Finger; it will not always be necessary to take off the whole Member, that is to say, the Finger, Foot, or Hand: But it will frequently suffice to remove the corrupted Bone alone. For Instance, when the last or middle Bone of one of the Fingers has been diseased, I have taken out the foul Bone, and left the sound Part of the Finger remaining. When the Metatarsal Bone, that supports the great Toe, has been diseased^b, I have removed the corrupted Parts from the sound, and saved the Toe. This I did in a Boy of ten Years of Age, and he recovered so well, that he walked afterwards as well as before^c. Where the whole Finger, or only the first Bone, has been foul, I have taken off whole Fingers and Thumbs.

Cure of the last Stage.

XV. In larger Bones, when the whole Bone is not affected, but only a Portion of its external Surface is disordered with a *Caries* or *Spina Ventosa*, you must by no Means take off the whole Limb, but remove that Part of the Bone only which is affected, in the same manner as we taught in the foregoing Chapter on the *Caries*, Sect. XVI. But when a large Bone, as the *Os Humeri*, *Tibia*, or *Femur*, or entire Joint of the Arm, Knee, or Foot, is diseased, there is no Remedy but Amputation; making your Wound in the sound Parts above all that is diseased: But we shall treat more fully of this Subject when we write on Chirurgical Operations.

When part only of a large Bone is foul.

When the whole Bone or Joint is diseased.

XVI. In certain Species of the *Spina Ventosa*, where the Tumor of the Bone will not yield to the Application which we have advised above, and you can come at it with your Hands, PETIT^d advises you to lay the Bone bare by a cruciform Incision, and to cut off the extreme Parts of the four Angles of the Skin: And when this is done, to dress with dry Lint. On the Day following you are to bore several Holes in the Tumor, so near each other, that it may be pierced like a Sieve: You are then to take the whole off with a Chissel and Mallet. The Wound is to be filled with dry Lint: And that the diseased Parts may separate the sooner from the sound, he orders the foul Part of the Bone to be dressed with a Solution of Mercury in *Aqua Fortis*. This Method is to be continued till you have obtained an Exfoliation. He is very high in the Commendation of this Process, and I think deservedly prefers it to any other Re-

Where the Tumor of the Bone will not give way.

^a SEVERINUS appears to be too fond of the actual Cautey in these Cases, Cap. 20. for frequently we cannot get to the Bottom with it, or the Parts are too much corrupted to expect Advantage from it.

^b LE DRAN, in *Obs.* 112. recites nearly the same Case, where he took off the *Metatarsus*, Toe, and all; but this should constantly be avoided where it is possible, for the Toe is of great Advantage in walking.

^c See in SCULTET. *Obs.* 90. the Case of a Thumb and Hand taken off for a *Spina Ventosa*.

^d *Lib. de Morb. Off.* Cap. de *Caries*.

medy in these Cases, even to the actual Cautery, where the Caries has not penetrated too deep.

How to remove an Exostosis.

XVII. When an acute Eminence or Excrescence, which is properly called an *Exostosis*, pushes preternaturally above the Bone, creating no Disturbance, Pain, or Deformity, and unaccompanied with *Caries* or *Spina Ventosa*, as I have frequently seen them; in my Judgment it is best to let it alone: For the Remedy will be worse than the Disease, and, by laying the Bone bare, you may bring on a *Caries* or other Inconveniencies. On the other hand, if it occasions any Deformity, impedes any Action, or produces Pain or other Mischiefs, you may take it off in the manner we have just taught above. You may see various Cases of *Caries*, *Spina Ventosa*, and *Exostosis*, in the Figures of that splendid Work, CHESELDEN's *Osteography*, from Plate XLI. to the End: In RUYSCH, *Obs.* p. 94. in his *Thesaur. Anatom.* VIII. *Tab.* 3. and *Thesaur.* X. *Tab.* II. and BIDLOO's *Oper. Anatom. Chirurg.* p. 208. *Tab.* II.

CHAP. X.

Of ULCERS of the HEAD.

What these Disorders are.

I. IT remains with me now to say something of Ulcers of the Head, and particularly of those which occupy its hairy Part, and are at this Time called either *Tinea*, *Favus*, or *Achores*: But the Professors of Medicine do not at all agree about the Signification of these Terms. By the Term *Favus*, we commonly understand Ulcers of the Head, that are full of Cavities like a Honey Comb. By *Achores*, those Ulcers which are full of small *Foramina*, which contain a moderately viscid Humour. Many call these Disorders *Tinea*, because, from the Abundance of small *Foramina* in them, they resemble moth-eaten Garments. But for the most Part, the Term *Tinea* at present is applied to a large dry Scab, which Children and Infants are subject to upon the Head, full of thick foul Scales, and very offensive to the Smell: This sometimes extends itself to the Face, in which Case we call it *Crusta Lactea*. This is often benign and of a mild Nature, but sometimes ill-conditioned and dangerous. There is still a worse Kind of *Tinea*, or scabby Head, covering the whole hairy Scalp with an ash-coloured thick Crust, attended with a violent Itching, and stinks grievously: This is generally very difficult of Cure. Persons afflicted with this Complaint, have a very pale unhealthy Countenance. These Disorders are much more frequently met with in Infants and Children than in Adults. They are occasioned either by the Nurse's irregular Course of Life, or by the Child's being used to foul Feeding, from whence foul Blood is made, which produces Ulcers of this Kind. Sometimes they break out in an adult State, resembling a Kind of Leprosy, which is very difficult to cure. In the *Pox* you frequently find both Head and Face, particularly the Forehead, spread with dry Scabs, and scabby Ulcers, which is called a *Venereal Scabies*. Venereal *Gummata* also and *Tophi* of the Head, may be referred to this Class, since they frequently degenerate into Ulcers.

II. Though

II. Though the Ulcers which we have just described, differ from each other ^{Cure.} in some Particulars, yet I shall not speak separately of them in this Place, as they are to be cured pretty nearly in the same Manner. When they are slight, it will be proper to give a gentle Purge now and then, with the Addition of a small Quantity of *Mercurius Dulcis*; administering between whiles to an adult Patient, Decoctions of the Woods, with edulcorating Pills, Powders, or Essences. Infants at the Breast may take diaphoretic Powders: But their Nurses may prosecute this Intention with Powders, Pills, Decoctions, or Essences. Externally, you may anoint the Scabs with *Cremor Lactis cum pauca Cerussa præparata mistus*; or with *Oleum Ovorum* alone, or with the Addition of a small Quantity of *Oleum Cerae*; or with *Unguentum de Enula, de Cerussa, Diapompholygos*, or with any other of the same Intention: Observing at the same Time Regularity in Diet, and defending the Body from the Injuries of the external Air. By this Method, not only Ulcers of the milder Kind are healed, but even those of the more malignant Sort; especially if you give small Quantities of *Mercurius Dulcis* at the same Time, or mix *Mercurius Vivus* with your Ointments. But these Medicines are to be used with Caution.

III. In worse Degrees of this Disorder, especially where you cannot be per- ^{Another Method.} suaded to use Mercurials, you will never succeed in your Cure, till you have taken off all the Hair, with which these Ulcers have a strong Connection. In some Places it is the common Practice to pull out the Hair by the Roots, either by Degrees, or at once, with a *Pitch Plaster*^a, which is spread upon a strong Cloth, or upon Leather, and applied all over the Head, after the Hair has been cut off as far as the Scabs. When it has taken fast hold, they let it lie on for twelve or twenty-four Hours, and then they tear it off at once, and it brings away with it both the scabby Crust and the Roots of the Hair: But this cannot be done without great Pain and Effusion of Blood. When the Plaster is torn off, they wipe away the Blood with dry Lint, and anoint the Head with some *Oleum Laterinum*, with the Addition of a little *Oleum Cerae* warmed, and cover it with the *Emplastrum de Spermate Ranarum pauca Camphora impregnatum*; dressing in this Manner every Day, till the injured Parts are clean, and then they heal with *Oleum Ovorum vel Essentia Succini*^b. They prescribe internal Medicines to correct the Blood, such as you saw in *Seç. II.* and advise Regularity in Diet. Antimony either alone, or mixt with a small Quantity of *Flores Sulphuris*, is very serviceable in this Case. You should diligently avoid beginning with the Use of Mercurial or Sulphureous Ointments; because they are very apt to repel the noxious Humours, and endanger the Life of the Patient: Which Effect they are not observed to have, after you have administered Cleansers of the Blood for some Time internally.

IV. In scabby Ulcers of the Face, which happen in the Infant State, and are ^{Cure of the Crusta Lactea.} vulgarly called *Crusta Lactea* or *Achores*, the same evacuating and corrective Medicines are to be prescribed for the Nurses, which we ordered above *Seç. II.* The Infants themselves also should be purged frequently, and in the Intervals

^a JUNKER in his *Surgery*, p. 280. recommends a Plaster of Pitch, Scammony, and Resin.

^b WEDEL tells us, that the *Tinea* may be cured, and Vermin in the Head at the same time destroyed, by washing the Head over with liquid Pitch; applying previously internal Medicines. *Lib. de Morb. Infant.* p. 61.

between purging, should take diaphoretic Powders prepared *ex Antimonio Diaphoretico, Lapid. Cancrorum, Antimonio crudo, & Flor. Sulphuris*. When they have taken these Medicines for some Time, you may daub the scabby Parts with a Liniment made *ex Cremore Lactis cum Cretâ vel Cerussâ*; or in the room of this you may use *Oleum Ovorum cum pauco Olei Laterini*. Ointments prepared of Mercury or Sulphur are very dangerous in the Beginning of this Disorder, or to very weakly Infants. But if Remedies of this Kind should be used by unskilful Persons, which is frequently the Case, to the Detriment of the Patient, you must endeavour to strike the Humours out again by prescribing Sudorifics in different Forms, both to the Infant and its Nurse, till you have satisfied this Intention.

End of the FIRST PART.

INSTITUTIONS OF SURGERY.

THE PREFACE.

HAVING finished the first Part of our Institutions of Surgery, which treats professedly of the Five Kinds of Disorders of the Human Body, which require the Assistance of the Surgeon; to wit, Wounds, Fractures, Luxations, Tumors, and Ulcers; we shall proceed now to the Second Part, which is dedicated to Chirurgical Operations. And in this Volume we shall take an Opportunity to treat of such Disorders as remain undescribed, either as not properly belonging to any of the foregoing Heads, or such as require particular Contrivances and Machines to be made Use of in their Cure. In doing this we shall consult Order as far as the Nature of the Subject will admit of it. We shall first describe those Operations, which may be performed in almost all, or at least in various Parts of the Body; as opening a Vein, making Issues, applying the actual Caustery, taking off Excrescences or intire Parts of the Body. We shall then proceed to those which have their proper Situations, and happen each to one particular Part of the Body. In performing this Part of our Work, we shall begin with those which belong to the Head and each of its Parts, as the Cranium, Eye-lids, Eyes, Ears, Nose, Lips, Teeth, Gums, Tongue, Palate, Tonsils, Uvula, &c. Then we shall describe those Operations,

rations, which are accommodated to Disorders of the Neck: From thence we shall proceed to the Breast, so on to the Abdomen, and its neighbouring Parts, to wit, the Anus and Pudenda of both Sexes. Lastly, we shall describe those Operations which are performed on the upper and lower Extremities. Notwithstanding the great Number of these Operations, and the various Methods of performing them, will render this Task extremely difficult, yet it shall be our principal Care to explain the Nature of each particular Operation, the best Method of performing it, and the fittest Instruments to be made use of for that Purpose, with all the Clearness that the Subject will admit of. By pursuing this Method, we shall not only teach the young Beginner the first and solid Principles of Surgery; but the Surgeon also who has already had some Experience in his Profession, will, I hope, find something in these Institutions, by which he may, in some Measure at least, perfect and adorn his Art.



INSTITUTIONS OF SURGERY.

PART II.

Of OPERATIONS.

SECT. I.

Of GENERAL OPERATIONS *practicable in several different Parts of the Body.*

CHAP. I.

Of PHLEBOTOMY *in general.*

I. **W**E begin with the Operation of *Phlebotomy*: Because it is of all the most general, performed in most Parts of the Body, and by much the most frequent in Use at this present Day. By *Phlebotomy* or Bleeding we here intend the opening a Vein, by a sharp-edged and pointed Instrument of Steel, for extracting a proper Quantity of Blood, either for the Preservation or Recovery of a Person's Health. Phlebotomy what.

II. Venesection appears to be not only one of the most useful, but most ancient Operations in Surgery: Since we find, by the Writings of HIPPOCRATES, CELSUS, and others, that it was even celebrated near three thousand Years ago. Yet there have not been wanting some among the Antients, and Moderns, who have reviled this Practice, as both cruel and fatal to the Healths and Lives of Mankind, as ERASISTRATUS, PARACELSUS, HELMONT, PORTIUS, BONTEKOE, GEHEMA, &c. But I think all their Objections too weakly founded to need any Refutation; which might very well be made even only from the daily Experience we have of the great Usefulness of this Operation, in alleviating, preventing, and curing most Disorders of the human Body, especially those A most ancient and useful Operation.

those of the acute and inflammatory Kind. The Operation is said to have been first hinted to us by the *Hippopotamus*, who, at stated Seasons, used to open a Vein with a sharp-pointed Reed, according to POLYDORE VIRGIL, *De Rer. Inventor.* p. m. 65.

Phlebotomy
often diffi-
cult.

III. Nor is the Operation in many Cases practicable with so much Ease and Safety as is commonly imagined. For though in some Patients the Veins lie so open and conspicuous, that even a Novice will find no Difficulty in making their Apertion; yet in others they are either so small or deeply situated, that the most expert Surgeon is sometimes at a Loss, and may, by Accident, miscarry. Add to this, that as the Arteries, Nerves, and Tendons, are frequently very nearly seated to the Veins, it is no uneasy Matter to injure one or other of them with the Instrument used in Bleeding: Which is quickly followed either with a profuse or fatal Hæmorrhage, an Aneurism, violent Pains, Inflammation, Fever, Mortification, or even Death. Phlebotomy therefore should be performed with no less Judgment and Caution, than the other important Operations in Surgery: Especially as the Reputation of a young Surgeon may suffer as much by Neglect or Accidents in this Way, as in many of the other less usual and seemingly more difficult Operations.

Qualifica-
tions of the
Phlebo-
tomist.

IV. A good Phlebotomist should have a steady, nimble, and active Hand, with a sharp Eye, and undaunted Mind; without which he may either be liable to miss the Vein, or commit some Accident that may be injurious or fatal to the Patient and his own Character. For these Reasons it is that Venesection is less readily practised by the Surgeon as he advances in Years: Because old Age is generally accompanied with a weak Eye and a trembling Hand.

Instrument
for Bleeding.

V. The Instrument which is in common Use amongst the Surgeons for opening a Vein is called a *Lancet*. The Shape of this Instrument is described at *Plate I. A.* and at *Plate XI. Fig. 5.* The Surgeon should take Care to be always provided with a sufficient Number of these, and to have them constantly in order, and to have some also of a larger Size. Thus he will be prepared for Veins in different Subjects. And as this is an Operation that frequently requires to be performed on a sudden, he will never be at a Loss. There are many Surgeons in *Germany*, particularly in *Franconia*, *Bavaria*, and *Lower Saxony*, who bleed with a *Fleam*, *Plate XI. Fig. 3.* which they use in this Manner. They hold one of their Fingers upon the Part B, and applying the Point A to the Vein, they strike the Part C with one of the Fingers of the other Hand, opening the Vein as Farriers do in Horses. Some of the Surgeons and Bagnio-Men use a neater Instrument, an *Elastic* or *Spring Fleam*, which the *Germans* call *Schnapper*, or *Schnapperlein*, *Fig. 4.* When they have drawn it up, they apply the Point A to the Vein, and then let it go by pressing upon B. Some again use a *Lancet* in the Form of a Dart, the Figure of which you may see in CRONE *de Venesectione*, p. 33. *Fig. 4.* But since the Position and Size of the Veins is different in different Subjects, we find that the most convenient Instrument for our Purpose is the *French Lancet*: Though many of our Surgeons are very expert in the Use of the *German Lancet*, *Fig. 3* and *4.*

In what
Part the
Operation
is to take
place.

VI. Though the Operation of Bleeding is frequently performed in different Parts of the Body, as in the Hand, Foot, Forehead, Temples, Neck, Tongue, Penis, and other Parts; yet it is most generally performed in that Vein of the Arm which lies near the Joint of the *Cubit*. Therefore we shall begin with teaching

teaching the Method of opening this Vein, and treat more fully of it than of any other.

CHAP. II.

Of OPENING the VEINS of the ARM.

I. IT is commonly enough known, that the Operation of Bleeding in the Preparation for Bleeding. Arm is performed on the Veins that lie on the internal Part of the *Cubit*. There are several Things worthy the Surgeon's Notice in this Operation: Some of which regard the Things that are to be done preparatory to Bleeding; some in the Operation itself; others immediately after the Performance of it. Of each of which we shall speak distinctly in their Order. Preparatory to Bleeding you should have in readiness, (1.) a *Linen Fillet*, about a *Paris Ell* in Length, and two Fingers in Breadth, with or without small Strings fastened at each End of it. (2.) Two *small square Bolsters*. (3.) *Porringers* or Vessels to receive the Blood. (4.) A *Sponge* with warm Water. (5.) Some *Vinegar*, *Wine*, or *Hungary Water*, to raise the Patient's Spirits if he should be inclinable to faint. (6.) Two *Assistants*, who must be void of Fear, one to hold the *Porringer*, the other to reach you any thing that you shall want. (7.) A *small Wax Candle*, when the Patient is to be blooded at Night, or in a dark Place. (8.) You must place your Patient upon a *Couch*; or, if he is very fearful of the Operation, lay him up on a Bed, lest he should fall into a Swoon. (9.) Lastly, you should take Care that no Hair or the Cloaths of the Patient lie in your Way. The Patient himself should take Care that nothing should give him any Concern: And he should avoid terrifying himself with recollecting the Mischiefs which have happened by the unskilful Performance of this Operation. Lastly, the Operator should be as expert in bleeding with his left Hand as with his right. For, as you are readier at bleeding in the right Arm with your right Hand so when you are to open the Veins of the left Arm, you will find it necessary to use your left Hand: And there are some Patients who insist upon being blooded in the left Arm.

II. Though the Operation is to be performed at once, with one Puncture, yet many things are to be observed in order to render it successful. First, it is necessary for the Surgeon to inspect his Patient's Arm diligently, that he may see the Course of the Veins: He must then take hold of the Arm, and extend it towards his Breast, tucking up the Sleeve about a Hand's breadth above the Bend of the *Cubit*, where he must make his Ligature, rolling the Fillet twice round, and fastening it with a Knot (*Plate XI. Fig. I. D.*) The Veins being compressed, and the Blood being stopped in its return, they will enlarge, and lie fairer to the Eye. The Ligature generally used upon these Occasions is a Slip of fine Scarlet Cloth, but any other Colour will answer the Purpose as well. When you have bound up the Arm in this Manner, you let it go for a small Time till you have taken a Lancet out of your Case: And opening it so that it may make a Sort of an obtuse Angle, you take hold of it with your Teeth about the Joint (*A. Plate XI. Fig. 5.*) and hold it some time till the Veins grow turgid. You are then to lay hold of the Arm again in the same Manner

What is to be done in the Operation.

as we directed before, and extend it to your Breast, having an Assistant ready with the Vessel in his Hand, at a convenient Distance for receiving the Blood.

What Vein
is usually
opened.

III. You are now to examine which Vein lies fairest, and is therefore most proper to be opened. For you must observe that in the Arm there usually appear three principal Veins: The first is called *Vena Cephalica*, and is found in the external Part of the Arm. See Plate XI. Fig. 1. A. The Second is termed *Basilica*, and lies on the internal Part of the Arm: In the right Arm it is also called *Hepatica*; in the left, *Splenetica*, See *ibid.* Letter B. The Third, which is obliquely situated between the former two, is called *Mediana*. See Letter C. The median and basilic Veins, as they are larger than the cephalic, discharge a greater Quantity of Blood, but are attended with more Danger in the Operation: For a considerable Artery and the brachial Nerve lie under the basilic Vein, and the Tendon of the Biceps Muscle under the Median. But as they lie fairer to the Eye, and are therefore more frequently the Subjects of the Operation we are treating of, than the cephalic Vein, it is safer and more eligible for the less experienced Surgeons to open the basilic, or at least the Median Vein. But sometimes the Veins are so situated in the Arm, that only one of them will lie exposed to View, which deprives you of all Choice. Your only Safety in this Case depends upon your Choice of a skilful and cautious Surgeon.

In what
Part the
Vein is to be
opened.

IV. When you have determined which Vein to open, you are to perform the Operation on that Part which presents itself fairest to you. But if the Vein has frequently been opened, and the Part which appears largest and fairest is full of Cicatrices, you are not to open above, but below the Cicatrices, by which Means the Blood will discharge itself more freely: For the Part above is generally straitened by the Cicatrix. For this Reason, whenever you open a Vein for the first Time, begin as high as you can, by which Means you will have the more room to descend in repeated Bleedings.

What is
to be done
immediately
before
Bleeding.

V. Before you apply the Lancet to the Skin, when the Veins are not risen it will be proper to rub the Arm below the Bandage, which will drive the Blood back towards the Cubit, and render the Veins more turgid. Whilst this is doing in the right Arm, the Surgeon should take hold of the Patient's Arm in such a Manner that he may lay his Thumb upon the Vein which he intends to open, to prevent the Blood from flowing back, and to keep the Vein from rolling. You are now to fix your Eye upon that Part of the Vein which you intend to open, and taking the Lancet out of your Mouth with your right Hand, so placed that the Thumb and first Finger may be fixed about the Middle of the Blade: The other Fingers should rest gently upon the Patient's Arm, to prevent your Hand from slipping.

How the
Puncture is
to be made.

VI. Your Lancet is now to be pushed lightly and carefully forward by your Thumb and fore-finger, till it has penetrated through the Coats of the Vein; and at that Instant to be raised a little upwards in order to enlarge the Orifice of the Wound, which will give a freer Passage to the Blood. The most common and convenient Size of an Orifice is about twice the Breadth of the Back of an Ordinary Knife. You are to keep even between the two Extremes of Rashness and Timidity in making the Puncture. For as in one Case you will only divide the common Integuments, and so leave your Work undone: So in the other you will run the Risque of wounding the Artery, Nerve, or Tendon.

The Vein may be opened in three Directions. Some open it in a strait Line, *Plate XI. Fig. 2. Letter A.* Others transversely *B*: But most Surgeons make an oblique Wound *CD*. If the Vein is to be opened in the left Arm, the Surgeon must change Hands, and do all with his left Hand, which we have directed above to be done with the Right. If you are to bleed with the *German Fleam*, place the Point *A* upon the Vein; and taking hold of the Extremity *B* with your left Hand, drive the Point of the Fleam into the Vein by a Stroke with one of the Fingers of your Right Hand. But if you will phlebotomise with the Spring-Fleam, *Fig. 4.* you cock it, by elevating the Hook *c*; and placing the Point *A* upon the Vein, by letting loose the Spring, it is by a gentle Pressure plunged into the Vessel.

VII. Your Aperture being thus made, and the Instrument drawn instantly back, the Blood will then rush forth from the Orifice either in a large or small Stream: Hereupon your Instrument must be deposited in the Basin or Dish, and not thrown upon the Bed, lest it should be lost, or else injure the Patient. In the mean time the Blood must be permitted to flow as long as it shall be judged useful or necessary: And if it should stop too soon, as it often may from too great a Stricture of the Bandage on the Arm, it must be slackened a little, by which means the compressed Artery being set at Liberty, the Blood will flow from the Orifice as at first. If you find the Orifice obstructed by too great a Tension of the Skin, or an Intrusion of the *Membrana Adiposa*, you ought in that Case to return the bit of Fat, by pressing with the Finger or a warm Sponge, and to relax the Skin by bending the Arm a little. Lastly, if the Orifice be obstructed by thick, grumous, or congealed Blood, that Impediment may be removed by wiping it with a Sponge dipt in warm Water.

Treatment
after Aper-
tion.

VIII. But that the Patient's Arm may not become painful or languid, by holding it long extended, the Surgeon should support it by the *Cubitus* for a little while; and then give him a Stick, or other cylindric Body, to turn round in his Hand, that by the Contractions of the Flexor and extensor Muscles of the Fingers, the Course of the Blood may be accelerated towards the *Cubitus*: Which will be still further promoted, if the Patient urges a little voluntary Cough. In the mean time his Attendants should stand ready with other empty Cups or Vessels for receiving the Blood, to carry off such as are full, and administer the Dressings for the Deligation, with cordial Water, and other such Necessaries.

Method of
closing and
binding up
the Orifices.

IX. The Quantity of Blood necessary to be taken from the Vein at one Bleeding, must be determined by the Physician, from considering the Patient's Disorder, Strength, Habit, and other Circumstances. But when the Surgeon attends his Patient without a Physician, he may then safely proportion this Evacuation himself at his own Discretion, by reflecting on the Nature of the Patient's Case, his Age, Strength, Course of Life, and fulness of Habit, &c. for he may permit the Patient, that shews no Paleness of Countenance, nor Diminution of Strength or Spirits, to bleed longer than those that quickly grow faint, &c.

What must
be done by
the Patient
and his At-
tendants.

X. When there seems to be a sufficient Quantity of Blood discharged, the Ligature must then be immediately taken off from above the Elbow, and the Skin about the Orifice must next be gently stroaked or pressed together by the two fore-fingers of the left-hand: By which means the Lips of the divided

The Quan-
tity of Blood
to be taken;

Vein are more easily compressed and closed. But while the Surgeon is doing this with his Left Hand, he takes the smallest of the two Compresses brought to him by the Servant, and applies it upon the Incision with his Right-hand: But so as to let what little Blood may remain betwixt the Orifice and the Vein, be discharged, before he imposes the Compress. Over the first or small Compress he should impose another that is a little larger, pressing them both gently on the Orifice with his left Thumb, till the Bandage is laid across. But before the Deligation is performed, according to the Directions we shall give for that Purpose in the last Part of our Surgery, on Bandages, it will be a Piece of Neatness and Decency in the Operator, to wipe off what Blood may have adhered to the Arm with a wet Sponge or Napkin, and then to go on with his Bandage. There are indeed many Surgeons who apply but one Compress, which they first wet in Water, Vinegar, Wine, or its Spirit: Though, in my Opinion, two Compresses make the Deligation more firm and secure: Though I think it is no great Matter whether they are applied wet or dry; the dry will fit easiest on the Part.

Treatment
after Deli-
gation.

XI. Having applied your Bandage, and drawn down the Patient's Sleeve over his Arm: He should be ordered not to use it too early or violently, before the Orifice is well closed, which might excite a fresh Hæmorrhage, an Inflammation, Suppuration, or other bad Accident. And if the Patient should faint away soon after the Operation, it may be then convenient to wet his Nostriils with *Hungary* Water or Vinegar, and to sprinkle some of the last, or else cold Water, in his Face: And especially in Summer-time to let in the fresh and cool Air, by opening the Windows, &c. Also, if any Wine or cordial Water be at hand, you may give the languishing Patient a small Draught thereof; and then the Surgeon will have nothing more to do than wash his Hands, and the Instrument, before he puts it up in his Case.

Judgment
passed on the
Blood.

XII. In the next Place, it is often customary to ask the Opinion of the Surgeon or Physician present, concerning the healthy or morbid State of the Blood, from its external Appearance. In this Case the Surgeon should always make a good Prefage to his Patient and By-standers, even though the Blood should appear bad: For it is not easy to express the good Effects that may follow from clearing up the Patient's Mind, which is much better than to leave a heavy Impression on it by a severe Prognostic. Therefore, if the Blood appear florid, the Surgeon should declare it a Sign that the Patient either is, or speedily will be in good Health. If the Blood appears vitiated, or of a bad Colour, he must then pronounce the Bleeding will be extremely serviceable to him. If the Patient should, in the mean time, be in a Swoon, the Surgeon should take Occasion even from thence to signify the great and speedy Effect the Discharge will have towards the Recovery of the Patient's Health. When such or the like encouraging Discourse has been passed, the Blood should be set by in a cool Place, till the Physician or Surgeon renews his Visit.

Whether
the Patient
may safely
drink or
sleep after
Bleeding.

XIII. If the Patient should be thirsty after Bleeding, you ought not to deny him the Pleasure of drinking, especially thin Liquors. The *French* make it a Custom to give the Patient a large Draught of Cold Water after Phlebotomy in inflammatory Disorders: In which Cases, if the Patient be of a warm Habit, that Practice may be extremely beneficial. But in cold and weak Habits, it ought not to be encouraged: For them it will be better to give some warm
Sup-

Suppings of Tea, Coffee, or the like. If any body should propose the Question, Whether the Patient may sleep safely after his Bleeding, your Answer may be either in the Affirmative or Negative, according to particular Circumstances. If the Evacuation was made by way of Prevention, or to preserve the Body in its healthy State, it will be more adviseable for the Patient to shake off his sleepy Disposition by walking, or engaging in some agreeable Sport or Exercise: Because if Sleep be indulged, the Bandage may get loose, or slip up above the Orifice, and sometimes thereby occasion a profuse and dangerous Hæmorrhage. This Objection ought not, however, to deprive the Patient of a comfortable Repose, in case of great Weakness and Indisposition; especially if he has had no Sleep for a long time before: Then it would be denying him a Benefit perhaps greater than the Remedy of Bleeding itself. But for the greater Security, it may not be amiss to let the Nurse, or some body, have a watchful Eye over the Patient during his Repose; that in case of such an Accident, timely Relief may be had by compressing the Vein with one's Finger till the Surgeon can be called.

XIV. When the Surgeon or Physician comes again to visit the Patient, the Blood is usually set out again to have a fresh Judgment passed upon it: In which Case the Verdict given ought to be such as will exhilarate the Patient, and not depress his Spirits, agreeable to what we said before on this Head at Sect. XII. The Surgeon must in the next Place inspect the Deligation, to see if the Bandage be too loose: And in taking it off, if the Compress adheres to the Lips of the Orifice, he ought not to force it away, but to apply his Bandage over it again as before. After waiting a Day or two longer, it will spontaneously separate, or fall off from the closed Orifice, which will by that time be near cicatrized. There are some, who being prejudiced in Favour of the enthusiastic Doctrine of Sympathy, will have their Blood run into cold Water, or have cold Water poured upon it, in febrile Complaints, thinking by that means to allay the Heat of the Blood. In this Respect it may be of service to humour and satisfy their Minds, though there may be nothing in the thing itself.

CHAP. III.

Of PHLEBOTOMY in the HAND.

I. THERE are two principle Veins in the Hands, which with us in Germany ^{What Veins are opened in the Hands} many are sometimes opened to bleed the Patient. The one is called *Salvatica*, and runs on the Outside of the Back of the Hand towards the Little Finger, being sometimes denominated *Splenica* by the Antients, who judged its Apertion extremely useful in Melancholy, and Disorders of the Spleen. The other Vein, which is termed *Cephalica*, runs betwixt the Thumb and Forefinger, and was formerly so denominated from an Imagination, that bleeding from it was more particularly useful than from others in Disorders of the Head. But we are at present convinced those Notions of the Antients were without Foundation; and though the Patient is bled more difficulty and slowly by these Veins, yet the Effects will be the same as after Phlebotomy in the Arm. Yet

it may be sometimes convenient for the Surgeon to open them either at the particular Request of the Patient; or when the Veins of the Arm are very deeply or obscurely situated, and these lie fair and conspicuous for Incision. To which we may add, that Women, in many Parts of *Germany*, pregnant, especially, toward the latter End of their Time, generally choose to bleed by this Vein, from an Imagination that it occasions less Injury or Weakness to the Fœtus.

Method of
phlebotomizing
in the
Hand.

II. When you are therefore determined from particular Reasons to phlebotomise in the Hand, the Patient must first hold it in warm Water for some time, rubbing it therein well with his other Hand, in order to make the small Veins become turgid and conspicuous. After this you are to fix a Ligature upon the *Carpus*, that the Veins may continue in that Manner distended. When the Hand has been wiped dry with a Napkin, you make an Apertion in the most convenient Part of the Vein in the Manner we directed for Veins in the Arm. If the Blood does not flow copiously from the Orifice after Incision, the Hand should be placed again in hot Water, and taken out when the Discharge is judged to have been sufficient. This done, the Hand is wiped dry with a Napkin, the Orifice defended with two Compresses, and your Bandage applied as we shall direct in *Part III. Chap. VI. Sect. X. on Bandages.*

C H A P. IV.

Of BLEEDING in the FOOT.

The Veins
opened in
the Foot.

I. BLEEDING in the Foot is an Operation of very old standing. It having been an Observation made by the most antient Physicians, that Phlebotomy in this Part proved highly serviceable in most Disorders of the Head and Breast, and for an Obstruction of the menstrual and hæmorrhoidal Flux: Upon which Discharges greatly depended the healthy State of both Sexes. For these Reasons they therefore denominated those Veins of the Foot, *Saphena* and *Cephalica*: The last of which extends itself from the internal Ankle to the great Toe; and the first, from the external *Malleolus* to the smaller Toes. But why one of them should be thought or denominated more cephalic than the other, there is not the least Reason to be offered; since bleeding from either of them has altogether the very same Effect. Therefore, in my Opinion, the Surgeon should always open that which lies fairest and most conspicuous. But if the Veins upon the *Metatarsus*, or Instep of the Foot, do not well appear, it may be then convenient to open one of those at the Ankle, or about the Calf or Ham of the Leg, as I have frequently done myself. Nor is the Phlebotomist so liable to injure any of the Tendons in these last Parts as he is upon the *Metatarsus*. In the mean time the Operator should, in single Women, expect the Order of some prudent Physician for his bleeding by these Veins: Because some of them, who are evil-minded, endeavour by this Means to procure a Miscarriage; which, when known, might make the Phlebotomist a Sharer in the ill Report.

II. For

II. For the more easy and successful Apertion of these Veins, the Patient must first wash both Feet well for some time in hot Water: That when the Veins become sufficiently turgid, the Surgeon may take his Choice of that which presents fairest either in the Right or Left Foot, without paying any Deference to the Distinction of Right or Left, in any of the forementioned Disorders. For the Effect, as we observed, will be the same in either, if they are disposed with equal Advantage for Apertion. Having fixed upon the particular Foot and Vein, your Ligature must be applied about two Fingers Breadth above the Ankle; and then the Patient must return it into the warm Water while the Surgeon takes out and prepares his Instrument or Lancet. Then kneeling down on one Knee, the Surgeon takes out the Patient's Foot from the warm Water, and having wiped it dry with a Napkin, places it upon his other Knee, or else upon a Board laid over the Vessel of hot Water. He now fastens or secures down the Vein from slipping with his Left Hand, as in *Chap. II. Sect. V. & seq.* But if the Veins do not appear well under the Ancles, the Ligature must be removed higher, about two Fingers Breadth above where you intend to make the Apertion of the Vein which best offers itself. 'Tis to be also observed, with regard to the Surgeon's Posture, that he may seat himself on a low Stool or Chair, and place the Patient's Foot in the most advantageous Manner upon either Knee. This Method will be preferable to the other in Bleeding with the Spring-bleed, as many do in *Germany*: Or the Patient may here set the Foot for the Operation upon a low Stool, or any other Support.

Manner of opening these Veins.

III. The Blood from the Vein thus opened may be received into a Glass Cup or Basin: And if it does not flow freely from the Orifice, the Foot should be returned into the warm Water; which will either prevent or dissolve the congealing of the Blood that in this Case often obstructs the Aperture. When a sufficient Quantity of Blood has been thus drawn, which may be known partly from the Time, and partly from the Largeness of the Stream, as also from the Redness of the Water, and Condition or Strength of the Patient; the Orifice is then to be closed by the Finger, and, after drying the Foot with a Napkin, to be secured by Compresses and Bandage. Concerning the Usefulness of Venesection in the Foot, consult the Dissertations of PERDUCIUS, HEREDIA, and STAHL, who have been opposed by HECQUET, in *Lib. sur la Saignée du Pied*. Paris. 1724. The first have been again seconded by Jo. Bapt. SILVA Medic. Paris. in *lib. de l'usage des différentes sortes des Saignées*, Amstelod. 1729. Animadversions against this last were also published at Paris in 1730, by M. CHEVALIER, Physician, and QUESNAY, a Surgeon there.

Treatment after Apertion.

CHAP. V. *Of BLEEDING in the Veins of the FOREHEAD, TEMPLES, and OCCIPUT.*

I. THERE are many Physicians and Surgeons, who think that bleeding by the Veins of the Forehead and Temples is much more serviceable and expeditious in relieving all Disorders of the Head, such as violent Pains, Vertigo, Delirium, Melancholy, and Raving Madness, &c. than the like Discharge

When and how these Veins are to be opened,

by

by Veins more remote from the Parts affected; judging that their Vicinity renders them more capable of evacuating the offending Matter of the Disease. But, for my own Part, I must frankly own, that to me there seems to be little or no Foundation to expect any considerable Difference in the Effects of Bleeding from these Veins, in order to a more expeditious Removal of such Disorders: And this because the external Veins of the Forehead and Temples have little or no Communication with the Brain and internal Parts affected, and do generally yield but a small Quantity of Blood. In my Judgment, Bleeding by the jugular Veins seems more likely to answer that Intention, as they receive the Contents not only of the forementioned Veins, but also of those immediately spent on the Brain and Parts affected, and are also more large and conspicuous for Apertion. Yet if the Surgeon be expressly ordered by the Physician to phlebotomise in the Forehead or Temples, in compliance therewith, he ought to observe, that before he proceeds to incise the Veins, an Handkerchief or Neckcloth ought to be drawn tight round the Neck; that, by compressing the jugular Vein, those Branches of it may become more turgid and conspicuous. The Vein being opened, the Patient must hold down his Head, that the Blood may not trickle from his Forehead into his Eyes or Mouth, when the Stream does not spin out with sufficient Force. If the Blood does not stop of itself after a due Quantity is discharged, you must compress the Orifice with your Finger; and, after wiping the Forehead and Face, apply a Compress or two, and then your Bandage.

Phlebotomy
in the Occi-
put.

II. Bleeding from the occipital Veins, which communicate with the lateral Sinusses of the *dura Mater*, is both by Reason and Experience proved to be serviceable in most Disorders of the Brain, where that Part is overcharged with Blood, which may be this Way diverted and evacuated. The celebrated Anatomist MORGAGNI^a especially recommends it, with Scarification and Cupping in those Parts, for all lethargic Disorders: And ZACUTUS LUSITANUS gives an Instance of a desperate Apoplexy removed by deep Scarification and Cupping upon the Occiput, *De Medic. Princip. Hist. Lib. I. Hist. 33*. These occipital Veins are opened by the same Apparatus as the Vein of the Forehead.

C H A P. VI.

Of BLEEDING in the VEINS of the INNER CORNERS OF THE EYES.

When and
how these
Veins are to
be opened.

IT is well known from Inspection, and the Writings of Anatomists, that there are two Veins which run one on each Side the Nose through the *Canthi Majores*, or inner Corners of the Eyes; which proceed partly from the Forehead, and partly from the Eyes, and do, like the frontal Vein, discharge their Blood down into the external jugular Veins. 'Tis^b bleeding in these canthal Veins that has been universally approved by DIONIS and the Generality of Oculists for Inflammations and other Disorders of the Eyes: But upon no better Foundation in my Opinion, than that of bleeding in the Forehead and Temples, (*Chap. V.*) However, when you are to phlebotomise in these Corners of the

^a *Adversar. Anat. VI. Animadver. 83.*

^b See his *Surgery*, Edit. 2. p. 494.

Eyes, you must first make a Stricture about the Neck; and, after your Incision, the Patient must incline his Head, that a sufficient Quantity of Blood may be discharged from the Orifice without running into his Mouth: And then you apply a thick triangular Compress with Bandage. As for bleeding in the Veins of the Eyes, we shall consider that in treating of the Disorders incident to that Organ.

C H A P. VII.

Of BLEEDING in JUGULAR VEINS of the NECK.

I. IT has been a very antient Practice to bleed in the external Jugular Veins of the Neck, for most inflammatory Disorders of the adjacent Parts, for a Quinsey^a, Phrenzy, Madness, Ophthalmia, Apoplexy, inveterate Head-achs, Lethargy, and other Disorders of the Head. Nor are there wanting many among our modern Surgeons and Physicians to encourage the same Practice, and that even from the Authority of Reason and Experience: Since the accumulated and obstructed Blood and Humours may be this Way discharged from the Parts affected, and their bad Consequences prevented. Nor is the Operation at all dangerous; since the Jugular Veins run on each Side the Neck from the Head to the Clavicles, immediately under the Skin, and appearing generally very large, they may be easily perceived and opened: Before which you must make a Stricture upon the lower Part of the Neck with a Handkerchief, Neckcloth, or the common Ligature, which must be drawn tight by an Assistant or the Patient, to make the Vein turgid and conspicuous. Or you may place a loose Bandage about the Neck, and let it be drawn downward strongly over the Patient's Breast, either by himself or an Assistant: By which Means the Jugular Veins will be compressed on each Side, and become turgid without occluding the *Trachea*, or obstructing Respiration^b.

When and
which Veins
of the Neck
are opened.

II. When the Jugular Veins have been by this Means rendered turgid and conspicuous, either of them which appears plainest may be secured by the Finger for Incision, either in the Right or Left Side of the Neck indifferently; when the Disorder lies in the whole Head, or in the Neck and Fauces. But when only one Side of the Head, or one Eye is affected, I think the Vein ought to be opened on the disordered Side of the Neck. The requisite Quantity of Blood being taken, the Ligature is next removed, and the Orifice compressed with your Finger, if the Blood does not stop without, while you wipe clean the Neck, and then apply your Compress and circular Bandage. Thus the Blood stops without any Danger of a fresh Hæmorrhage, of which some are without Reason afraid, as I have often experienced. Lastly, it must be acknowledged that the Patient faints away as readily after bleeding in the Neck, as the Jugular Veins are safely and easily opened: But no Danger follows from

The Man-
ner of inci-
sing the Ju-
gulars.

^a GOWEY reckons it a specific in this Case. See his *Surgery*, p. 274.

^b While I am revising these Sheets for the Press, occurs a Woman to whom I prescribe bleeding in the Jugulars for a violent *Ophthalmia*; but upon applying the Ligature to her Neck, there is no Appearance of the Veins, an Accident I never before met with.

thence.

thence. We have an excellent Treatise on the Usefulness of bleeding from the Jugulars, published at Breslaw in 8^{vo}. 1735, by TRALLESIIUS, a learned Physician of that City.

Of BLEEDING in the VEINS, called Ranulæ, under the Tongue.

IT is very often found of no small Service in a Quinsy, or other inflammatory Disorder of the Neck to bleed in the two small Veins which run under the Tip or End of the Tongue: Especially if a larger Vein has been opened before, either in the Neck, Foot, or Arm, whereby the inspissated and stagnating Blood may be gradually evacuated. To bleed in these Veins, a Stricture being made upon the Neck as before, you then elevate the *Apex* of the Tongue with your Left Hand, while, with the Lancet in your Right, you circumspectly open first one, and then the other on each Side: Because the Apertion of one only will hardly ever discharge Blood enough to give any considerable Relief. When you judge a sufficient Quantity of Blood has run out of the Mouth into your Vessel, remove the Ligature from the Neck: Upon which the Flux usually stops of itself. But if it should still continue, let the Patient take a little Vinegar, or *Frontiniac* Wine in his Mouth: Or else you may apply a bit of Viuriol or Allum; or a Compress dipt in some styptic Liquor, till the Hæmorrhage ceases: Which can never be dangerous even without such Topics. For if there be not a good large Quantity of Blood discharged in the inflammatory Disorders of these Parts, the Apertion of these Veins will be of little or no Signification. Yet there are Instances where Patients have died for want of stopping Blood in these Veins. See *Mix. Nat. Cur.* A IV. *Obs.* 101. and *Ephem. N. Cent.* I. p. 188.

C H A P. IX.

Of PHLEBOTOMY in the PENIS.

BLEEDING in the *Vena dorsalis Penis* usually surpasses the Benefit of all Remedies whatever in abating inflammatory Disorders of this Member. This large Vein, which runs along the Back or upper Side of the *Penis*, being generally pretty much distended, and conspicuous in an Inflammation of this Part, may be incised about the Middle or back Part of the *Penis*; and kept bleeding till the Member becomes flaccid, and a sufficient Quantity of Blood be discharged proportionable to the Urgency of the Symptoms. This done, you must apply a Compress, and the Bandage proper for the *Penis*, as we shall direct in the third and last Part of our Surgery. But you must carefully endeavour to avoid injuring the Arteries or Nerves which enter the *Penis* near this Vein: As also not to make your Bandage too strict. For by these Means the Inflammation and Symptoms may turn out worse than before.

Of the SYMPTOMS or ACCIDENTS which attend
PHLEBOTOMY.

CHAP. X.

Of an ECCHYMOsis.

I. **M**ANY are the Accidents which may follow from the Apertion of a ^{Ecchymosis,} Vein. But we shall here only consider the Principal, and begin with ^{what.} an Ecchymosis, or Extravasation of Blood from the Vein betwixt the Flesh and the Skin: Of this there may be various Degrees: So that the Arm hereby often becomes not only much swelled, and of a black and blue Colour, but is even sometimes violently inflamed with a most acute Pain, and followed either with a Suppuration, or incipient Mortification in the Limb.

II. The Accident we are now treating of frequently proceeds from the Vein ^{Causes.} having been cut quite asunder by the Phlebotomist: But oftner from the Patient's using his Arm too early after bleeding, in violent and long Exercises; in which the Contractions of the Muscles make the Veins swell, and force their Blood through the Orifice into the Interstices betwixt the Flesh and Skin, either in a greater or less Quantity, in proportion to the Degree of Violence and Exercise.

III. In a slight Ecchymosis or Effusion of Blood under the Skin, there is ^{Consequences of a slight Ecchymosis.} little or no Danger to be feared, as the stagnant Blood may be generally dispersed without any great Difficulty by the Application of a Compress dipt in Vinegar and Salt, or in Spirit of Wine. Sometimes the Blood suppurates or turns to Matter, which may be much promoted by a *Diachylon* Plaster: And when the Matter is once brought to Maturity, it generally makes its own Way through the Integuments, without the Assistance of any Incision: After which, being discharged, the Wound may be healed with a bit of *Diachylon* Plaster.

IV. If the Quantity of Blood stagnating in an Ecchymosis be very large and ^{Treatment of a large Ecchymosis.} considerable, there is generally but little or no Hopes left to disperse it: But the Disorder too often terminates either in a large Abscess or a Gangrene, after violent Pain and Inflammation have preceded. But to prevent these Consequences, the Surgeon must take his Scalpel, and scarify, or make many little Incisions upon the livid Part to discharge the extravasated Blood; and then apply either a *Diachylon* Plaster, or the Fomentation before recommended for Contusions and Phlegmons, *Part I. Book I. Chap. XV. Sect. X. & seq. Book IV. Chap. II. Sect. XIV.* But if the Arm is already possessed with a violent Inflammation or Gangrene, you ought to scarify it well, and then to invest it with discutient Cataplasms or Fomentations, as we before directed in *Part I. Book IV. Chap. XIV. Sect. VI.* But at the same time in these Cases it is often necessary to bleed in some other Part, and to administer attenuating Medicines internally, till the Inflammation abates, or the Gangrene spreads no farther. You will see more on this Subject, *Chap. XII. Sect. XVI.*

C H A P. XI.

Of the PUNCTURE of a NERVE or TENDON in Phlebotomy.

Signs of this
Accident.

I. **W**HAT grievous and cruel Symptoms may arise from the pricking a Nerve or Tendon, we have before intimated, in treating of Wounds, *Part I. Book I. Chap. I. Sect. X. and XI.* But you may reasonably judge, that a Nerve or Tendon has been injured in Bleeding, if the Patient, at the Time of Incision, feels a most acute Pain, so that he can scarce refrain from a severe Outcry. In a short Time after, the excruciating Pains still continuing, the Limb swells, becomes inflamed, convulsed, stiff, and extended as in the Cramp; which Symptoms, if not timely relieved, threaten Convulsions of the whole Body, a Gangrene of the Part, and Death itself.

Treatment.

II. Among the several Methods of treating these Symptoms, from such an Accident, that seems to be one of the best, which was formerly used for the *French King, CHARLES IX.* by his Surgeon *AMB. PAREY.* For the King had no sooner declared his intense Pain, by crying out aloud, while the Vein was opening, than *PAREY* imagined, with good Reason, that some Nerve was injured: And accordingly, the Arm began to swell in a little Time with excruciating Pains, and at length became quite rigid. Hereupon the King's Physicians were immediately called in to a Consultation with *PAREY*, and the Treatment agreed on was first to bathe the Part injured with warm *Ol. Terebinth. cum Sp. Vin. rect.* and then to invest the whole Arm in *Emplast. Diachalciteos in Ol. & Acet. Rosar. solut.* retained by the expulsive Bandage, which, beginning upon the Hand, ascends gradually by spiral Turns to the Top of the Shoulder. By this Means the Impulse of the Blood on the Part was not only much abated, but also the Pain and Inflammation much diminished. And lastly, to compleat the Cure, the following Cataplasm was ordered to be applied to the Arm:

R. Farin. Hord. Orob. ana ʒij. Flor. Chamæmel. Melilot. ana Mij. Butyr. recent. ʒjss.

These boiled into a Cataplasm with Soap-suds, were applied to the Arm, till the Pain, and other malignant Symptoms, were totally removed. Notwithstanding which, the King had a Stiffness in moving his Arm for near three Months afterwards: But, by Degrees, that went off, and his Arm grew as strong and agile as ever.

A second
Method of
Cure.

III. Equal Success may be also expected from treating the Part with warm *Hungary Water* and *Bals. Peruv.* for several Days, till the Pain goes off: And as the *Diachalciteos* Plaster is seldom retained in many of the Apothecaries Shops, you may substitute *Emplast. de Minio vel Saturninum & Diapompholygos.* But great Care must be taken, in the mean time, while these Remedies are preparing, not to expose the Wound open to the Air. Therefore the Wound may be at first covered with a bit of any Sort of Plaster, and the whole Arm invested with a Linen Cloth moistened with Oxycrate; which will both abate the Inflammation, and exclude the Injuries of the Air or Dust from the Part. If the Patient be young, and of a full Habit, it will be also proper, at the same time:

time, to bleed plentifully in the other Arm. SCULTETUS, *Obs.* 83. has an Ointment which he much extols for Punctures of the Nerves, as you may there find: Where he also relates, that he has several Times successfully cut through, or totally divided, such punctured Nerves.

C H A P. XII.

Of WOUNDS of the ARTERIES in PHLEBOTOMY.

I. **I**N Bleeding, it sometimes happens, that an Artery is pitched upon and *Diagnos.* opened instead of, or together with, the intended Vein, and this more especially when the Surgeon bleeds in the basilic Vein of the Arm; near to which usually runs the large brachial Artery^a, an Apertion whereof must be followed with a dangerous Hæmorrhage, an Aneurism, or even Death. This HILDANUS^b, with myself and others, has often observed, either from the profuse Hæmorrhage, or from a Sphacelation of the Limb from the Course of the Blood being interrupted. That an Artery is thus accidentally opened instead of a Vein, you may discover by the Blood's spinning very forcibly from the Orifice, by Starts or Leaps, rather than in an even Stream, and extending itself into a greater Arch from the Orifice to the Receptacle: The Colour of the Blood is also here much more florid, or of a brighter red, than that from a Vein. To which add, that if you here press your Finger on the Vessel below the Orifice, the Blood starts out more violently than before, and quite stops; or else greatly diminisheth upon pressing above the Orifice. The Reverse of this is found in the Apertion of a Vein.

II. In case of such a dangerous Accident, the Surgeon must first endeavour to keep up his Presence of Mind, which is very apt to be confused by Fear, that thereby the Patient, or his Attendants, may not suspect his Error. In the next Place, he must carefully observe, whether the Blood flows freely from the Orifice, or whether it insinuates, in a considerable Quantity, betwixt the Integuments. If the first, he must take a large Quantity of Blood, even till the Patient faints, persuading him and his Attendants, that his Blood appears so hot and redundant, as to make so large an Evacuation absolutely necessary, after the Example of M. DIONIS^c, when he met with this Accident. When the Patient is in a Deliquium, as the Flux then ceases, you may commodiously dress and bind up the Wound, and by this Precaution hinder a fresh Hæmorrhage, or an Aneurism. While the Attendants are otherwise employed, the Surgeon must place a Farthing, or some other Piece of Money, in the Folds of the first Compress, which being fixed on the Orifice of the Arm wiped clean, he must, upon the first, place two, three, or more thick Compresses, each larger than the other: And then bending the *Cubitus*, he must, for the greater Security, apply two Bandages, in the same manner as after bleeding in a Vein, only a little tighter. It may be next proper to lay a thick, long, and narrow Com-

What the Surgeon must do in such a Case, when undiscovered to others.

^a But I have also sometimes observed this Artery near the Cephalic Vein.

^b *Obs.* 44. *Cent.* III. & LANCISIUS, *Lib. de Cord. & Aneurism.*

^c In his *Surgery*; *Chap.* of *Venesection.*

press upon the Arm, over the Artery, from its Incision to the *Axilla*, and to secure it in that Position by a spiral Bandage: That the brachial Artery being thus compressed, the *Impetus* of the Blood on the Wound may be abated; signifying to the By-standers, that the Patient's Blood is so ardent and rapid, that it cannot well be restrained from bleeding again, without this particular Deligation. Thus perhaps his Error may escape unsuspected. Instead of the first Compress with a Piece of Money, you may apply with equal, or more Advantage, a Lump of brown Paper chewed in your Mouth, and then the Moisture pressed out of it, secure it on the Orifice by several Compresses, and the Bandage as before.

Treatment
of the Pa-
tient after-
wards.

III. The Deligation being compleated, if the Patient does not then recover from the Swoon of himself, the usual Means are to be used to recover him, by sprinkling cold Water in his Face, opening the Windows, applying Volatiles, Vinegar, or *Hungary Water* to his Nostrils, &c. By which means, being brought to himself, he must be strictly charged to refrain from Exercise, to live on a spare and thin Diet, and not to use his Arm for some time, lest a Relaxation of the Bandage might occasion a fresh Hæmorrhage, or an Aneurism. To avoid this, it may be also requisite to suspend the injured Arm a little bent in a Sling about the Patient's Neck: And to keep it the more steady, the Sling may be pinned to the Patient's Clothes, and at Night laid in a convenient Posture on a soft Pillow.

Frequent
Visits ne-
cessary.

IV. A few Hours after the Deligation, the Surgeon ought to visit his Patient, and again, at short Intervals, as often as he conveniently can, in order to inspect the Arm and Bandage, to see that the latter sits tight, and to prevent the Insult of a fresh Hæmorrhage, Pain, Tumor, Inflammation, Gangrene, or other bad Symptoms. If every thing appears right, except only a small, uniform, and soft swelling of the Arm, the Bandage ought nevertheless to remain on the Arm, till the fourteenth Day: For such a Swelling does not presage any thing amiss, even though it infects the whole Arm. But if your Bandage is perceived to get loose, it ought to be taken off cautiously, and re-applied more closely. But while the Bandage is taken off from the Arm, the Artery ought to be compressed by the Tourniquet, or at least by the Thumb of an Assistant, grasping the Arm; the Surgeon in the mean time holding his Thumb or Finger pressed on the Wound, till he re-applies either the same or fresh Compresses and Bandage. But in this you must be careful not to force off the last Compress or Lump of brown Paper from the Incision, if it does not fall off of itself, but rather let it remain. However, if it should separate, you may dress the Wound with a little *Bals. Peruvian. vel Capivi.* till it is well closed, and out of Danger, nor liable to a fresh Hæmorrhage. If you come to your Patient, and find his Arm bleeding, the Trunk of the brachial Artery must be immediately compressed, either by the Tourniquet, or with the Thumb and Fingers of an Assistant fixed about the Middle of the Arm: And having provided more or thicker Compresses, and a longer Bandage, you then take off the old Dressings, wash clean the Wound with warm Wine, or its Spirit, and next proceed to renew your Deligation more carefully, as we before directed. If the Surgeon meets with the Appearance of a Gangrene from too great a Stricture of the Bandage, he must unbind and foment the Arm, or treat it with the

Re-

Remedies proper for that Case, and, augmenting the Number of his Compresses, re-apply his Bandage more closely than before. But if the Gangrene proceeds from a Loss of the Circulation through the Limb, by a Defect of the other arterial Trunk of the Arm, which seldom happens, in that Case you must amputate without delay.

V. If the Surgeon meets with none of the forementioned Symptoms, for some time after his Deligation, he must order the Patient to keep on the Bandage for a Week or a Fortnight longer, keeping his Arm, in the mean time, free from Exercise or Motion: Lest the Blood should, by that Means, force and extend the as yet tender *Cicatrix* into an Aneurism. His Diet must also be all along spare and light, as at the beginning; strictly avoiding all Wines and fermented Liquors, and every thing that will put the Blood into a violent Commotion: In which last Case the Surgeon will find it necessary to bleed in another Part. Thus you may avoid all Danger of an Hæmorrhage, or an Aneurism; and the Patient's Arm will become as well as ever, especially, if the Wound be dressed with a little *Bals. Peruv. vel Capiv. &c.*

The Patient's Regimen.

VI. Thus far have we described the Method, in which the Surgeon must proceed, when the Error is not discovered by the Patient, or his Attendants. But if either of them have smelt out the true Case, it will be the best Way for him to make a free Acknowledgment of his Mistake or Accident, excusing the same, by assuring them, it is no more than what may happen to the most expert Surgeon living, in opening some Veins: And then promising the Patient, that if his Directions are observed, he shall be perfectly cured, without any Damage: And thus he may compleat his Cure, perhaps better than if his Patient knew nothing of the Matter: For knowing the Case to be so much more dangerous than that of an incised Vein, the Patient will be more submissive, and the Surgeon's Orders more punctually observed.

What must be done if the Error is detected.

VII. When the Aperture of the Artery, and that of the Integuments, do not exactly correspond with each other, but the Blood being forced out of the Artery, insinuates itself betwixt the Flesh and Skin; in that Case, which very often happens, the Patient must not be bled *ad Deliquium*: For even after that, there may be so much Blood extravasated and retained betwixt the Integuments and Muscles, as may cause a Mortification of the Arm by its Putrification, or at least may render the Operation for an Aneurism absolutely necessary to be performed. If therefore the Surgeon cannot draw back the Orifice or Incision of the Integuments, so as to make it correspond with that of the Artery, and discharge the retained extravasated Blood, he ought immediately to compress the Wound with a Lump of chewed Paper, and several Compresses, each larger than the other, which are all to be firmly secured on the Part by the Bandage or Deligation before described at Sect. II. of this Chapter; not forgetting the long Compress and Bandage, which we recommended for compressing the brachial Artery. Then, after bleeding plentifully several Times, in some other Part, the Remainder of the Treatment may be according to Sect. III, IV, V, and VI. preceding. But the Patient must be visited again in a little Time, to inspect the Arm: For it often happens, that when you have no apparent Bleeding after Deligation, yet the Blood will insinuate itself betwixt the Muscles and Integuments, so as to distend the Arm to an enormous Size. A remarkable Instance

Treatment when the Blood insinuates betwixt the Flesh and Integuments.

stance of this DIONIS^a gives from his own Practice. He was once obliged, in this Case, to incise the Integuments of the whole Arm, whereby he discharged four Pounds of Blood, that had been equally dispersed all round, from the Elbow to the Shoulder. And we also meet with a similar Observation in RUYSCH^b, in which concremented Blood was lodged almost all over the Arm. You may also consult BARTHOLIN. *Epist. Med.* 53. *Cent.* III. *Histor. Anatom.* IX. *Cent.* II. and his History of an Aneurism dissected, which he saw at Naples, *An.* 1644.

C H A P. XIII.

Of ANEURISMS.

What an
Aneurism is.

I. **A** Throbbing Tumor, distended with Blood, and formed by a Dilatation, Wound, or Rupture of an Artery, is by Surgeons usually denominated an *Aneurism*: Of which they distinguish two Kinds, the *true*, and the *spurious*. A true Aneurism has always a Pulsation, more or less, and is formed by a Dilatation only of the Artery, either all around^c, or on one Side of it, much in the same Manner as those analogous Tumors of the Veins are formed, which we term *Varices*. So that both Aneurisms and Varices are a Kind of *Herniæ* of the Arteries and Veins, and accordingly they are by some named *Herniæ Arteriarum & Venarum*. But the spurious Aneurism, is, when the Artery being opened by a Puncture, Wound, Contusion, Erosion, or other external Violence, extravasates the Blood betwixt the Muscles and Integuments, the Limb itself appearing livid, and much swelled thereby. A true Aneurism may also degenerate into one that is spurious, by a gradual Dilatation of the Artery, and Extenuation of its Coats, till at length being totally ruptured, the Blood is either extravasated and retained under the Integuments, or discharged freely from the Wound. Hence the Tumor is much larger and less prominent, or pointed in the spurious, than in the true Aneurism, and is also attended with little or no sensible Pulsation: But the Putrefaction of the extravasated Blood very often occasions a Gangrene and Mortification of the Part, or even Death itself, by a profuse Hæmorrhage. But Aneurisms may be again distinguished from their Circumstances and Symptoms, into *simple* and *complicated*. The first are formed without any ill Accidents: The last are usually attended with Immobility, violent Pain, an Abscess or Sphacelation of the Part, &c. which

^a *Chirurg. Operat. Demonstrat.* VIII. Chap. of Aneurisms.

^b *Obs. Anat. Chirurg. Obs.*

2. pag. 7.

^c 'Tis a little extraordinary that the learned Dr. FREIND should, in his History of Physic, contend that all Aneurisms are formed by a Rupture of the Artery; when we have so many Instances of their arising from a Dilatation only of the arterial Coats, either on one or all Sides. See that described by me in *Annal. Acad. Jul. Semestri* XII, p. 81. Those in PAREY's Surgery, and RUYSCHII, *Obs. Chirurg. & Hist. Acad. Reg. An.* 1712 & 1721. Also LANCISII *Lib. de Corde & Aneurismat. & Lib. de Mortib. Subitan. in Schol. Obs.* 5. & II.

more usually accompany the spurious Aneurism^a. Aneurisms may be also distinguished, from the Situation of the Arteries, into *external* and *internal*^b, the first being accessible, the others not. Another remarkable Difference of them may be taken from their having either a violent or else but little or no sensible Pulsation^c. For it is to be observed, as we before mentioned, that spurious Aneurisms seldom have any considerable Pulsation, especially when they are large; whereas the true Aneurisms, especially the small, have a very strong and sensible Pulsation: But in some of them the Pulsation increases, and in others it diminishes, as the Tumor enlarges. See my Account in *Annal. Acad. Juliae Semestri XII. pag. 81.*

II. In a true and external Aneurism, besides the forementioned Signs, we observe a small Tumor at the Beginning, no larger than a Filbert, which has always a Pulsation. (As for the internal Species, as they lie concealed from our Senses, little or nothing can be said of their Signs, with which, however, the Reader may be supplied in LANCISI's Treatise on the Subject.) The Tumor generally feels soft to the Fingers, with a Sort of Fluctuation and Resistance of a Fluid, and is almost constantly of the same Colour with the Skin, having a Pulsation like that of the Artery to which it belongs. Upon pressing the Finger on the Tumor, as yet small, it disappears: And upon removing the Finger it returns instantly again. But the spurious Aneurism appears livid, feels hard and turgid, with intense Pains: The Tumor is here more plain or equal, and generally without Pulsation, as upon pressing it affords a Sort of rumbling or fluctuating Noise; and distending the whole Limb, or a great Part thereof, to an unusual Size^d, it very often either degenerates into an Abscess or a *Sphacelus*.

III. Aneurisms most frequently arise in the brachial Artery, from an erroneous Puncture or Injury thereof, in bleeding in the Arm, especially in the Basilic Vein. For the Artery being in a constant Pulsation, will, by urging its Blood against the arterial Coats, gradually distend them where they make too little Resistance, so as at length to form a considerable Tumor. If therefore a throbbing or beating Tumor like that described in the foregoing Paragraph should appear in the Arm a few Days or Weeks after bleeding, it may be certainly depended upon to be an Aneurism. But the Origin of Aneurisms is not from the Lancet alone; nor is their Seat restrained to the Arm only^e; for

^a A remarkable Aneurism of the spurious Kind is described by BARTHOLIN in a professed Dissertation, entitled, *Aneurismatis Dissecti Historia*, Panormi 8^{vo}. 1644. See also VAN HORNE in *Epist. de Aneurismate*; and LANCISIUS, *Lib. de Cord. & Aneurism.*

^b Histories of internal Aneurisms may be seen in PAREY, *Book VII. Chap. 32.* MONS. BLEGNI, *Zodi. Med. Gallic. An. 1681, p. 44.* RUYSCH. *Obs. Chirurg. 37* LANCISII. *Et Annal. Acad. Juliae locat.*

Of which I have made many Observations besides those in PAREY, *loc. cit.* RUYSCH. *Obs. 38.* BLEGNI, *l. c. p. 25. & 42.* NUCK *Operat. Chirurg. Exper. XXIX.* LANCISII, *l. c.*

^d The spurious Aneurism often acquires an enormous Size, but the true one hardly ever exceeds the Bulk of a Chestnut, according to GOUVEY, *Chirurg. pag. 231.* But that his Opinion is not to be absolutely depended on, may appear from the several Accounts we have of larger Aneurisms, particularly one the Size of a Goose Egg in HILDANUS, *Obs. 44. Cent. III.* PURMANNUS *Chirurg. curiosa, p. 212.* And in our *Tab. XI. Fig. 6.*

^e AMB. PAREY, *Lib. IV. Cap. 32.* asserts the Neck to be the Part in which Aneurisms are most frequently formed; but his Opinion is not countenanced by our latter Experience and Observations.

they may arise from an infinite Number of Causes, both external and internal, and may be formed in all Parts where there are any arterial Trunks, or considerable Branches distributed. Thus we often meet with them from a Wound, Contusion^a, and Suppuration, and from external Injuries in most Parts of the Body. But internally they may arise either in the Thorax or Abdomen, from a Diminution of the Strength and Resistance of the external or internal Coats of the large arterial Trunks, from various Causes, as an Ulceration, Erosion, &c. agreeable to the Observations of FALLOPIUS, (*Lib. de Tumor, Cap. 14.*) SEVERINUS (*Lib. de Abscessibus*) RUYSCH *Obs.* 37. & 38. LANCISI (*Lib. de Cord. & Aneurismat.*) and our Observations in *Annal. Acad. Juliae Semestri XII.* p. 81. We must however confess, that the Causes of internal Aneurisms are often very doubtful and unsettled: Notwithstanding which, we ought to distinguish those Causes as they occur, into external and internal. They often proceed from a Blow, Fall, or a Fracture of the adjacent Bone, or a violent Straining in lifting great Weights, Jumping, Riding on Horseback, &c. whereby the Blood is accumulated and urged so forcibly in the Artery injured, as gradually to distend its Coats, and form a Tumor. Sometimes they are owing to an Inflammation, Suppuration, Erosion, or Ulcer in some neighbouring Part, or in a Part of the Artery itself: By which the other Coats are so weakened, that they are unable to support the Impetus of the Blood. Hence they give way, expand themselves, and swell. In the same manner too we often meet with Aneurisms from a slight Puncture, or even barely touching the Coats of an Artery with a Lancet in opening a Vein: In which Case the exterior Coat of the Artery being divided, and the interior remaining entire, the latter is not alone strong enough to resist the Impulse of the Blood, but gives way insensibly at each Ictus of the Artery, till it at length forms that considerable Tumor which we call an *Aneurism*. If we therefore consider that the mechanical Formation of Aneurisms is in this Manner from a diminished Resistance in the arterial Coats, we shall find the Causes thereof very numerous, which may weaken an Artery more in one Part than another; so as to make it give way to the Force of the Heart, or Impulse of the Blood, and form an Aneurism. And this especially, when several Causes concur together, as if violent straining or leaping, &c. be used when the Coats of the Artery are previously extenuated or weakened by a Contusion, Inflammation, Suppuration, &c.

Diagnosis
of injured
Arteries.

IV. I think we have in the preceding Chapter sufficiently explained the Manner of enquiring into the greater Injuries and Wounds of the Arteries, that may happen in opening a Vein. We shall here only enumerate the Signs by which we may discover slight Punctures, or the smaller Injuries of them, which occur in Phlebotomy. But as we are not supplied with any certain or characteristic Signs indicating such slight Accidents, we must make the best Use of a reasonable Conjecture. If therefore you should perceive a Pulsation against the Point of your Lancet, notwithstanding you have no Hæmorrhage from the Artery, yet you may reasonably conclude that the external Coat of that Vessel must be in some Degree injured thereby: And therefore it will be proper to

^a Thus FENRIUS has observed an Aneurism in a Lad, from a Blow on the Left Side of his Head, which, in the Space of eight Days, enlarged so as to cover half his Head. V. BARTHOLIN, *Epist.* 53. Cent. III.

make your Deligation and Compression to prevent an Aneurism, in the Manner we before directed in the preceding Chapter.

V. But if a small beating Tumor should be formed within the Space of a *Prognosis.* Month after Phlebotomy, either through the Neglect of the Surgeon or Patient, or from leaving off the Deligation too early, it may be pretty safely depended on to be one of these Aneurisms from a slight Cause. But if it be a true Aneurism, whilst it continues recent and small, it gives little or no Uneasiness, besides its Tumor and Pulsation: Yet when it has afterwards gradually acquired the Size of an Egg, or one's Fist, or even the Bulk of one's Head, as may be seen in PURMANNUS *Chirurg. Curios.* p. 612. and in our *Tab. XI. Fig. 6.* it then occasions intense Pains, Weakness, Immobility, and other bad Symptoms in the affected Limb. If then the Help of the Surgeon be not speedily called in, the arterial Coats becoming gradually extenuated, will at length burst, and be followed by a Train of the worst Consequences, if not the Death of the Patient. If the external Integuments should be broke through, a fatal Hæmorrhage must follow: And even if they should continue intire, an Abscess or Gangrene would destroy the Part, as I myself have observed here in a Patient at *Helmstadt.* See also RUYSCH, *Obs.* 2. Though the Generality of Aneurisms afford a dangerous Prognosis, a^a BARTHOLIN and b HARDER observe, yet none are so much to be feared as those which are formed internally in the larger arterial Trunks, where there cannot be had a free Access to the Parts, as in the *Aorta*, *Subclavian*, beginning of the axillary, brachial, and carotid Arteries^c, &c. Those Aneurisms too are generally incurable which are formed in the carotid Arteries of the Neck, in the Subclavian or Axillary near the Shoulder, and in the crural Artery, especially if near the Abdomen. For if the Operation be performed on any of these, it must be followed either with a profuse or fatal Hæmorrhage, or else a Mortification of the Parts. But those Aneurisms are much less dangerous, and frequently admit of a Cure which are formed in the external Branches of the Arteries, especially in those running on the *Cranium*, or without the Ribs, and those in the Foot, Hand, or lower Arm. Yet if the Aneurism be not recent, though even in the Arm, the Success of the Operation by the Knife will be at least very uncertain, when Deligation and Compression alone will not take their due Effect. For as the arterial Trunk must necessarily be closed or shut, it will be almost next to impossible to prevent the Parts, to which the Artery was distributed, from wasting away, or else from mortifying: Since the Circulation of the Blood, and their Supplies of Nourishment are by this means in a great Measure, if not totally, cut off; the lateral small Branches of Arteries being incapable of importing a due Quantity of Blood to the Hand and Parts of the *Cubitus*, when one of the larger Branches is wanting^d. This is therefore a frequent Cause of a Mortification in them, so as often to oblige the

^a See BARTHOLIN. *Epist. Med. Cent. III. Epist.* 53. ^b JO. JAC. HARDER, in *Apic. Obs.* 86.

^c LE DRAN, *Obs.* 40. T. I. relates, that he has found frequent Venesection of great Service in an Aneurism of the *Aorta*. I have experienced the same.

^d That the fellow arterial Branch of the *Cubitus* is not so often absent as Surgeons have imagined, is made apparent, with other just Anatomical and Chirurgical Observations, in a Medical Dissertation or Thesis had under me at *Helmstadt*, by Dr. MOEBIUS, *An.* 1730. the Substance of which I think to communicate in my Observations, which I intend to publish some time hence by themselves.

Surgeon to an Amputation, as hath been frequently experienced by myself and others^a; and even Amputation itself will very often not save the Patient, as may appear from the Case in BARTHOLIN, *Epist.* 53. *Cent.* When an Aneurism bursts spontaneously, the Hæmorrhage is generally so profuse, that the Patient's Life may be lost^b in a Minute's Time, if a speedy Compression be not made on the Artery by a strict Ligature, or the Tourniquet, and the Assistance of an expert Surgeon. And extremely dangerous is the Case when the Surgeon, by Neglect or Mistake, incises one of these large Tumors instead of an Abscess, as hath been sometimes done^c. Yet it ought to be observed here, that spurious Aneurisms are in the general much more dangerous than the true ones. True Aneurisms are sometimes tolerable without any great Danger or Uneasiness for many Years^d, or as long as the Patient lives; especially if they are defended and secured with proper Bandage and Compresses: Whereas on the contrary, spurious Aneurisms will not continue many Days without inducing an Hæmorrhage, Abscess, and Mortification in the Parts. But both the true and spurious Species of Aneurism are always the more dangerous and troublesome as they are larger: Insomuch, that their Size has deterred the expert and intrepid HILDANUS^e from performing the Operation on them. And RUYSCH openly declares^f, that, in the vast City of *Amsterdam*, no Surgeon had undertaken to perform the Operation for above twenty Years before him. The spurious Aneurism is also more difficult to cure even by the Knife than the true Species: Because the Blood which is extravasated and concreted all around gives the Surgeon immense Trouble to discharge it. As for internal Aneurisms, they not only lie concealed from our Senses, but are also absolutely destitute of any Help or Remedy from Art, because they are inaccessible to the Hand. But were an internal Aneurism to extend and shew itself externally, it could not be well subjected to the Operation, without greatly hazarding the Patient's Life: And therefore the Cure of such have been prudently refused by the most eminent Surgeons, as FALLOPIUS, PAREY, SEVERINUS, &c. cited in BARTHOLIN's *Historia Aneurismatis Dissecti*. And for the same Reason we here restrain our Doctrine and Treatment of this Disorder to the external Species of Aneurisms only. But they who desire a more particular Account of the Internal, may consult the learned Treatise on the Subject by LANCISI.

Treatment
of slight
Aneurisms.

VI. I shall now, for the Information of the younger Surgeon, describe the Method of treating an incipient Aneurism, forming itself in the Flexure of the *Cubitus*, or Bending of the Arm, where this Disorder more frequently occurs than in any other Part: And from hence, I think, he may easily judge of the Method in which other less frequent Aneurisms are to be treated. Whenever a small Aneurism of the true Species begins to form, and shew itself at the Flexure of the Arm, you are furnished with two Methods of relieving it, either by Deligation, or by Incision. The first of which may be again performed

^a V. RUYSCH, *Obs.* 2. BARTHOLIN. *Epist.* & VAN HORN *de Aneurismate*.

^b V. *Phil. Transact.* N^o 402. *Act. Erud. Lips.* Tom. III. pag. 401. PAREY, *Lib.* VI. *Cap.* 32.

^c V. PAREY, *Lib.* VI. *Cap.* 32. HILDANUS, *Cent.* III. *Obs.* 43. RUYSCHII, *Obs.* 38. VAN HORN & LANCISI, *loc. cit.*

^d Thus SENNERTUS (*Prax. Med. Lib.* V. *Part* I.) gives the Case of a Woman who sustained an Aneurism the Size of a Walnut on the Flexure of the *Cubitus*, without any Detriment, for the Space of thirty Years.

^e *Cent.* III. *Obs.* 44.

^f *Obs. Chirurg.* 2.

either by Compress and Bandage, or by an Instrument adapted for the Purpose. The Method of relieving and curing this Disorder by Deligation and Compression, if there be no Extravasation, ought always to be tried before that by Incision, as well in the incipient true as in the spurious Aneurism: For it would be barbarous to subject the Patient to a cruel Operation, for what may be remedied by a milder Treatment. The Patient may be therefore relieved, and the Tumor diminished by Compression, after discharging the extravasated Blood, either with a Compress of chewed Paper, or a bit of astringent Plaster, retained with the other Compresses and Bandage we described in the preceding Chapter. By which Means the Disorder may be considerably diminished, if the Deligation be continued on the Limb for several Weeks or Months: And thus we read of Cures performed as well formerly by HILDANUS (*Cent. III. Obs. 44.*) TULPIUS (*Obs. Med. Lib. IV. Cap. 17.*) ROGERUS, (*Zod. Med. Gall. 1681. p. 43.*) and others of the last, as well as of the present Century. But if Deligation be found insufficient, as it was upon the *French King's* Physician, M. BOURDELOT (*Zod. Med. loc. cit.*) Recourse must then be had to a particular Machine adapted to the Purpose of compressing the Aneurism; which if small, may, by the Assistance of that Instrument and a strengthening Plaster, be compleatly cured. Among the several Instruments contrived for this Purpose, we have selected the two represented in *Tab. IX. Fig. 8 and 9.* the Use and Application of which may be better understood from Inspection, than a verbal Description. We have also, in my Opinion, sufficiently explained it in our Exposition of *Tab. XI^a.*

VII. If the Aneurism is too large to receive any Benefit from Compression by Deligation, or the preceding Instrument; or, if a true Aneurism should, by a Rupture of the arterial Coats, degenerate into a spurious one, attended with a livid Tumor from the extravasated Blood, Immobility of the Arm, intense Pain, and the Danger threatened from an accidental or profuse Hæmorrhage; in that Case the Patient can have no Relief, but from the Operation by the Knife. Which Operation, however, being attended with much Pain and Danger, ought not to be undertaken without great Care and Circumspection, and with the Approbation or Advice of other eminent Physicians and Surgeons: Lest, if the Success thereof should turn out worse than expected, it might be rashly attributed to Imprudence or Misconduct in the Operator.

VIII. There are chiefly two Things required in the Operation: First, a Removal of the Tumor or Aneurism; and then to conjoin or heal up the Wound in the Artery. In the last Century they used to amputate the Arm for an Aneurism in *Italy*, and then applied an actual Cautery to the divided Artery, as we are told by BARTHOLIN, in his *Histor. Aneurismat.* But at present we endeavour to preserve the Patient's Arm, and remove the Aneurism by a much milder Treatment. For the successful Performance of this Operation, the Surgeon must attend chiefly to three Things: First, to stop the Flux of Blood through

Treatment
of large
Aneurisms.

What is re-
quired in the
Operation.

^a SCULTETUS also describes and figures an Instrument for this Purpose, in his *Armament. Chirurg. Edit. 4^{to}, Anno 1666. Tab. XIX. Fig. 4.* But his does not seem so well adapted as ours. DIONIS likewise mentions the Instrument contrived and used by Dr. BOURDELOT (described at large in BLEGNI's *Zod. Med. Gallic. 1681. pag. 43.*) for himself, by which Ponton or Bridge, he relates, that, within the Space of a Year, he was cured of an Aneurism in his Arm, as big as a Pullet's Egg.

the Artery by the Tourniquet, an Instrument unknown to the Antients: Secondly, to denudate the Artery, and free it from the adjacent Integuments; and, lastly, to contract or constrict the same, either by Medicines or Ligature^a. It will therefore first be necessary to have all the proper Instruments conveniently disposed in Readiness in a large Plate or Dish, that there may be no Delays in the Operation. This *Apparatus* must take in a *Tourniquet*, to compress the brachial Artery, (see *Part I. Book I. Chap. II. Sect. IX. and X. & seq. ad XV.*) a *Scalpel*, *Tab. I. G.* and a *Hook*, *Tab. VIII. Fig. 2. and 3.* to denudate the Artery: To which add a Sponge with some warm Wine, or its Spirit, a Pair of obtuse pointed Scissors, *Tab. I. C, or D.* some scraped Lint, square Compresses of several Sizes, one narrow Compress of a Span in length, with two large Pieces of Linen to invest the Arm: And, lastly, two or three Rollers of two Fingers breadth, and thrice as long as for Phlebotomy in the Arm. But if the Artery is to be contracted by Astringents or Caustics, the Success of which is very dubious and uncertain, you must then enlarge your *Apparatus* with some *Vitriolum Romanum*, *Butyrum Antimonii*, &c. Or if you secure the Artery by Ligature, which is the safest and universal Practice of the Moderns (because the Eschar made by Caustics has been often observed to give way, and excite a fatal Hæmorrhage) instead of Astringents or Caustics, you must then provide a crooked Needle armed with some strong waxed Thread, twice or thrice doubled; or, instead of a Ligature, by a Needle and Thread, you may apply the particular Instrument invented by me for this Purpose, and represented in *Tab. VIII. Fig. 4.*

How the Patient and Assistants are to be disposed.

IX. Your *Apparatus* being prepared, the Patient is next to be seated in a Chair, leaning back with his Arm extended, in the same Manner as for Phlebotomy. Then you must place four Assistants round him, in the most advantageous Position: And when the Aneurism is in the Right Arm, it is, in my Opinion, best for the Surgeon to stand on the Right Side of the Patient, placing the most expert of the Assistants next him, to hold the disordered Arm above the Tumor, together with the Tourniquet applied to it; that he may increase or diminish his Stricture on the Arm by that Instrument, as the Surgeon shall direct. One of the other Assistants standing before the Patient, is to hold the Arm fast by the *Carpus*, that he may not flinch, or withdraw it in the Operation. A third Assistant is to stand on the Left Side, holding the *Apparatus* of Instruments. The fourth, or last Assistant, must be ready to do any thing the Surgeon may find necessary to direct him, during the Operation. But if the Aneurism is in the Left Arm, the Surgeon and Assistants are to be disposed in the reverse Order, as any one may easily direct.

Application of the Tourniquet.

X. The first Part of the Operation consists in applying the Tourniquet about the Middle or upper Part of the *Humerus*, so as thereby gradually to compress the brachial Artery, (see *Tab. III. Fig. 1. K*) till you can perceive no Pulsation either in the Artery at the *Carpus*, or in the Aneurism itself. By which means you will be sure to avoid any considerable Hæmorrhage: But you must be careful to moderate your Stricture by the Tourniquet, so as not to injure the Nerves, or other sensible Parts. The Stick, by which the Tourniquet is twisted,

^a Surgeons formerly closed the Artery, by cauterizing with a red-hot Iron; but that is a Method too cruel, and is, at the same time, not secure, and often has pernicious Effects.

must be held by an Assistant on the Right Side; or if you use the Screw Tourniquet, represented in *Tab. V*, and *VI*. that will remain fast on the Arm, without holding. But it sometimes happens, as GARENGEOT observes in his Surgery, *Chap.* on Aneurisms, that the Tourniquet cannot be safely applied to the Arm in a spurious Aneurism, by reason of the great Extravasation and Tumor. In that Case you may therefore, as the Author directs, apply the Tourniquet over a Ball and Compress in the *Axilla*, so as to compress the Artery, by twisting the Stick of the Tourniquet above upon the Shoulder.

XI. When the Tourniquet is properly fixed and tightened upon the Arm, there are then three Methods of performing the Operation. The first of these is, by laying open the true Aneurism by a longitudinal Incision, continued upward and downward by the Scalpel, according to the length of the compressed Artery: Which done, you are to remove the vitiated Blood or Matter therein lodged, either by your Fingers, the Probe, or a Sponge. The Parts being thus cleansed, you must, in the next Place, slacken the Tourniquet a little, that the salient Blood may demonstrate the upper Orifice of the Artery to you. And in doing this, you need not constringe your Tourniquet again immediately, if the Patient be strong, and of a full Habit: But rather permit the Artery to discharge a few Ounces of Blood, more or less, as may be thought proper. When you have again tightened your Tourniquet, so as to exclude the least Hæmorrhage, if your Intention is to treat the Disorder by Caustics and Styptics, you must insert a bit of blue Vitriol, wrapt up in Cotton or Lint, into the upper Orifice of the Artery; securing it there by several small Compresses, each a little larger than the other, and filling up the rest of the Space on all Sides with rude Bundles of Lint. You must then make a strict Bandage, after pressing it close with the Fingers and Thumb of your Left Hand, over the affected Artery of the disordered Arm. Instead of intruding a Piece of Vitriol into the Orifice of the Artery, you may apply a Dossil of Lint dipped in, and expressed out of the Styptic Liquor of WEBERUS, or in Butter of Antimony: The Effect of which, being secured with Compresses and Lint as before, will be equal to, if not better than the first we proposed. Over the Dressings must be applied a square Plaster, and a large Compress of the same Form, to be closely retained by a Bandage, three or four Times as long as is commonly used for Phlebotomy in the Arm. M. DIONIS makes his Deligation without the Piece of Vitriol, for which he substitutes a Lump or two of chewed Paper, or Lint, dipt in some Styptic, which he covers with several small Compresses, each larger than the other, and secures the whole upon the incised Artery by Deligation: Which Method of dressing may, in many Cases, be convenient and proper enough.

XII. But in order the more effectually to prevent a future Hæmorrhage, it will be necessary to apply another Bandage over the former: And, after making some circular Rounds with it upon the Part affected, it is to ascend up the Arm upon the long Compress imposed on the brachial Artery on the Inside of the Arm, as we directed in the preceding Chapter. That this last Bandage may adhere more firmly, it will be necessary to pass it round the *Thorax*, when arrived to the Shoulder, and to fasten it off upon the Arm, disposing the Patient to rest. When your Dressings are thus compleated, and the Tourniquet a little loosened, you must observe whether any Blood issue through the Bandage: First Method of Operating.

dage : And if there be no Appearance of any, it is a Sign your Operation is well performed.

Procedure in
Case of an
Hæmorrhage.

XIII. But if you perceive any Blood ooze through the Dressings, the Artery must be again compressed by the Tourniquet, your Dressings taken off, and re-applied with more Care and Exactness: Or else a more certain Method must be taken to secure the End of the Artery, by Ligature, with a crooked Needle and a double waxed Thread, which is the only infallible Means of defending the Patient from a fatal Hæmorrhage, and was formerly proposed by PAULUS ÆGINETA^a, one of the most antient among the *Greek* Physicians. But in making this Ligature, the Surgeon must have a principal Regard to two Things: He must avoid injuring both the Artery itself and the adjacent Nerve. In order to which, it will be most convenient to make your external Incision through the Integuments sufficiently large, and then carefully to separate the Nerve from the Artery, to which it is attached, by a small Hook: And then to pass the Head, or obtuse End of the Needle, foremost under the Artery, till you can take hold of the Thread, that its Point may not hurt either that Vessel or the Nerve. Or else, instead of a Needle, you may pass your Ligature under the Artery, by the Instrument which I contrived for that Purpose in *Tab. VIII. Fig. 4. C.* This Instrument is to be withdrawn when your Ligature is opened and drawn a sufficient Length from under the Artery, which is then to be tied with it upon a thin Compress of scraped Lint, with which you are to defend or invest the Artery before the Constriction of your Ligature. The Artery being thus securely tied up, you leave about a Hand's Breadth of the Thread or Ligature hanging out of the Wound: In which Manner it is to continue till the Artery is closed, and the Ligature comes off spontaneously. There are some Surgeons who also direct the lower Orifice of the incised Artery to be secured by a Ligature as well as the Upper: And there are others again who think the same to be useless, or even mischievous, as indeed it may be, when the Disorder being in the Flexure of the Arm, the larger Incision and Cicatrix this Way made, will, in some Measure, impede or stiffen the Motion of the Joint. But if the Aneurism be not in the Joint, or in the lower Part of the *Cubitus*, and you perceive Blood to issue from the lower Orifice of the divided Artery, then you may, and even ought to make a second Ligature below, as well as above. And thus, after I had tied the upper Orifice in an Aneurism of the cubital Artery, upon relaxing the Tourniquet, I perceived Blood start from the lower Orifice, which I therefore secured like the other, by tying it with a crooked Needle and strong Thread: So that by their Assistance, with the Application of Balsams, I happily cured the Patient, though a little before in very great Danger of Death. In the same Manner you must also make a Ligature both above and below, even in the Flexure of the *Cubitus*, if you thus find it necessary; or at least you must compress the lower Orifice of the Artery by a proper Bandage and Compresses: in which Method I once accomplished

^a *Lib. VI. de Re Medica, Cap. XXXVII.* where he says, If a Tumor or Aneurism is formed from an Injury of the Artery, we make a longitudinal Incision through the Integuments: And dilating the Lips of the Wound by Hooks, we denude the Artery, under which we pass a Needle and double Thread, tying it above and below. The intervening Part of the Artery betwixt the Ligatures we lay open by Incision, and after discharging the Contents, we suppurate till the Ligatures are digested off.

my Cure of this Disorder, without making a Ligature below. When the Artery has been thus secured by Ligatures, it is a common Practice with some Surgeons to divide it transversely a little beneath the Ligature; that the contracting or receding of the Artery into the Flesh may compress its Extremities, and the better prevent a consequent or dangerous Hæmorrhage. But in my Opinion that Practice is improper, or at least it is unnecessary; as I have twice successfully performed this Operation, and happily cured the Patients of their Aneurisms without thus dividing the Artery. Lastly, you are to fill the Wound well with scraped Lint, to be firmly secured by Compresses and a strict Bandage, as we before directed, and as we shall more largely explain and demonstrate in our third and last Part of Surgery or Bandages.

XIV. In the next Place it is a common and no improper Practice with some Surgeons to guard against an Inflammation by laying Linen Compresses dipped in Oxycrate, on each Side the affected Parts of the Arm, to be retained by a spiral Bandage; and then to bleed the Patient in another Part: Which may be very necessary Precautions in Patients of a warm and full Habit. But Phlebotomy with those cooling Applications will be pernicious in such as are of a cold Constitution, and have before lost much Blood in the Operation or otherwise; notwithstanding the *French* recommend that Treatment to be generally followed without any Restriction. For I have myself cured several in which I not only omitted Bleeding and the Oxycrate, but even used warm Applications of *Sp. Vini Calid. Camphorat. cum Theriaca*. Your Deligation or Dressing being thus compleated, the Patient is to be put to Bed, and his Arm laid in an easy or a little inflected Posture upon a Pillow, and the Patient is to be ordered at the same time to move himself as little as possible, in order to restrain the Impulse of the Blood from the Heart on the affected Artery. If you should perceive the Arm to swell violently, and threaten an Inflammation, lest it should be occasioned by too great a Stricture of your Bandage, you must take it off and apply it again as we directed at N. XII. preceding. But for a small Tumor or other slight Symptoms you should not hastily remove your Bandage, for fear of a profuse Hæmorrhage: Especially as Experience teaches that even a livid Swelling of the Arm may be sustained in these Cases without any bad Consequence, provided the Swelling be not over painful or tense, nor infested with any of the Symptoms of a Gangrene: Under which Circumstances we have directed you to a Method in the preceding Chapter.

Method of
preventing
an Inflam-
mation,

XV. But in order to prevent a fatal Hæmorrhage, when the Cure of an Aneurism is attempted by Astringents or Caustics only, without making a Ligature on the Artery, it may be proper for an Assistant constantly to attend and lie by the Patient, provided with a Tourniquet and the Method of applying it to compress the Artery in Case of such an Accident, till the Surgeon can be called to make a Ligature on the Vessel by a crooked Needle and double Thread. But such an Accident is, in my Opinion, best prevented at first by taking up the End of the incised Artery with a Needle and Thread, rather than to trust to the Uncertainty of a Constriction or Eschar made by Caustics. 'Tis also a prudent Practice of some Surgeons to arm their Needle with three Threads; which being passed under the Artery, two of them are tied and the other left loose to be fastened afterwards by itself when the other Threads are relaxed, so as to permit a fresh Hæmorrhage.

How to pre-
vent an Hæ-
morrhage.

XVI. With

Manage-
ment of the
Dressings.

XVI. With regard to the Bandage and Dressings, if they adhere firmly upon the Parts, they ought not to be removed on any slight Occasion, before the third or fourth Day; except a great Inflammation, Tumor, or Hæmorrhage should make it necessary to renew the same. Then the Surgeon must take Care that the Tourniquet be duly applied and fixed upon the Arm, or else the Artery compressed by the Fingers of an Assistant before he proceeds to take off the Bandage and Dressings: And even then he ought not violently to force off the Compresses if they adhere, which might bring on a profuse Hæmorrhage; rather let them remain. When he has cleansed the Wound as much as possible, he should fill it with fresh Lint saturated with some digestive Ointment, leaving such Parts as adhere to be spontaneously separated, in the succeeding Dressings. In this Disorder the Dressings ought to be repeated as seldom as possible, especially within the first fifteen Days; and then it should be made with all the necessary Cautions to prevent a Rupture of the Artery and a profuse Hæmorrhage.

Treatment
of Inflam-
matory
Heats, Fe-
vers, and o-
ther Symp-
toms.

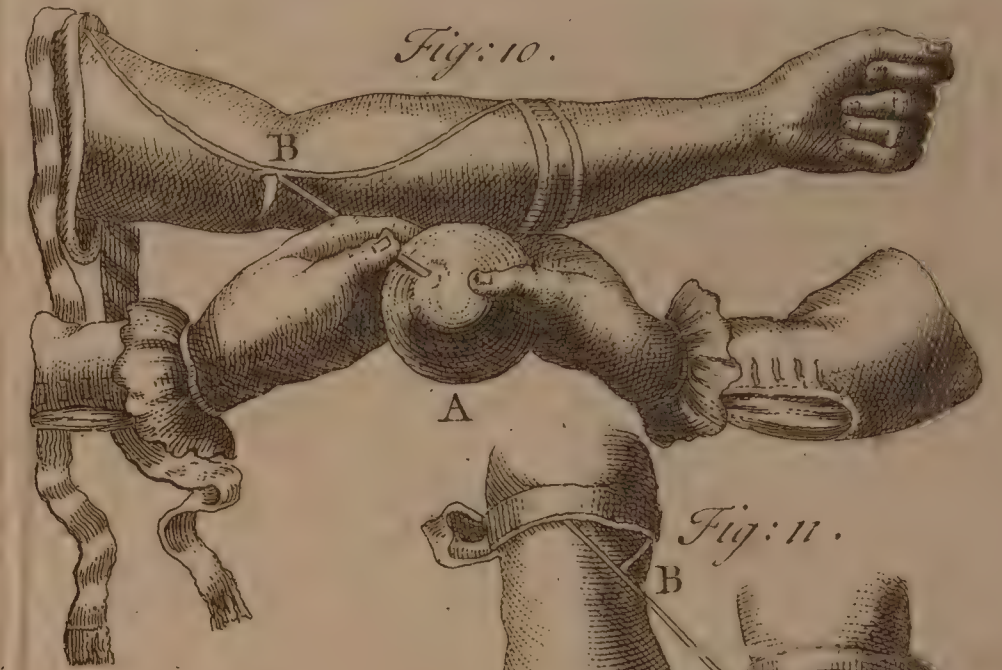
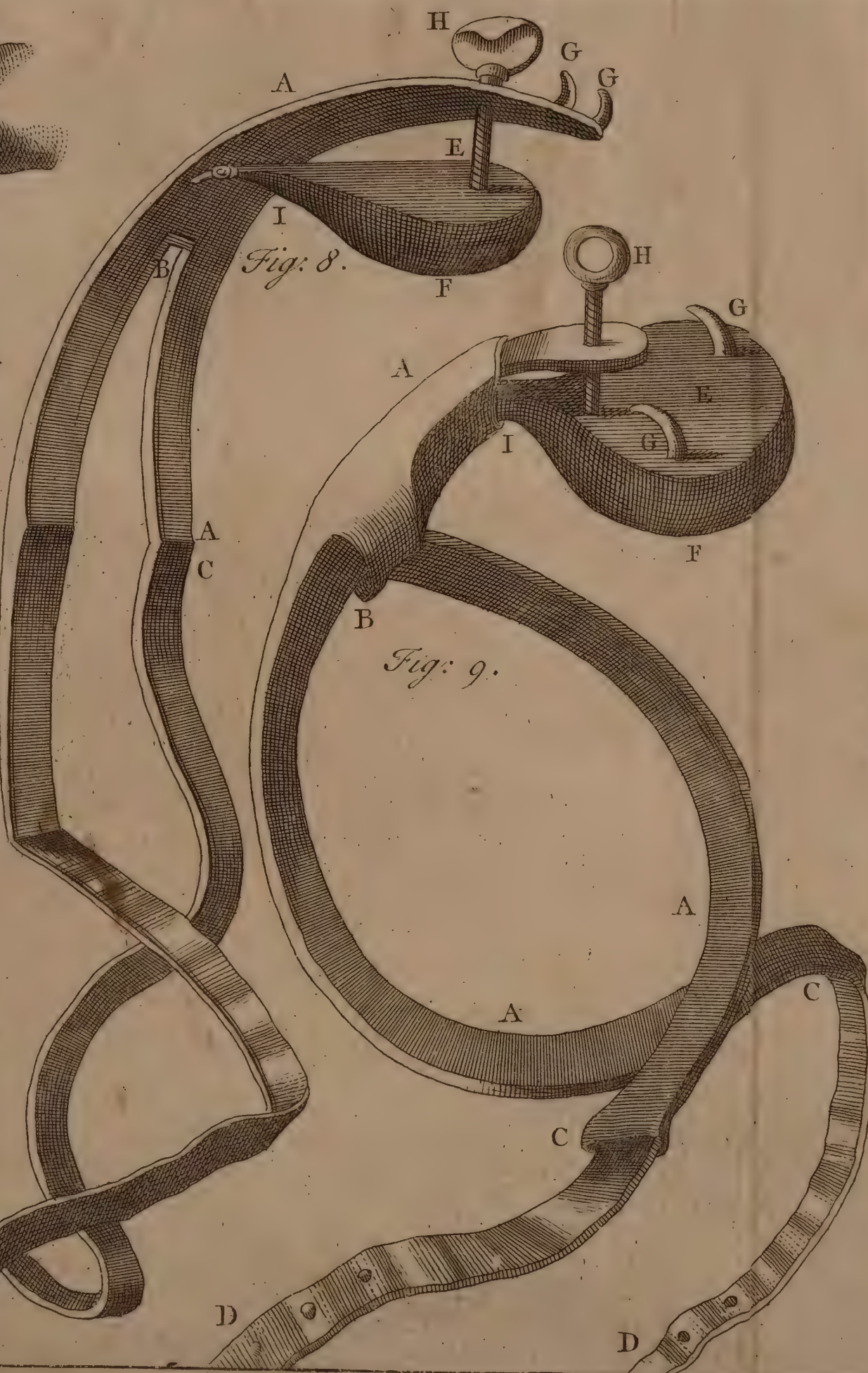
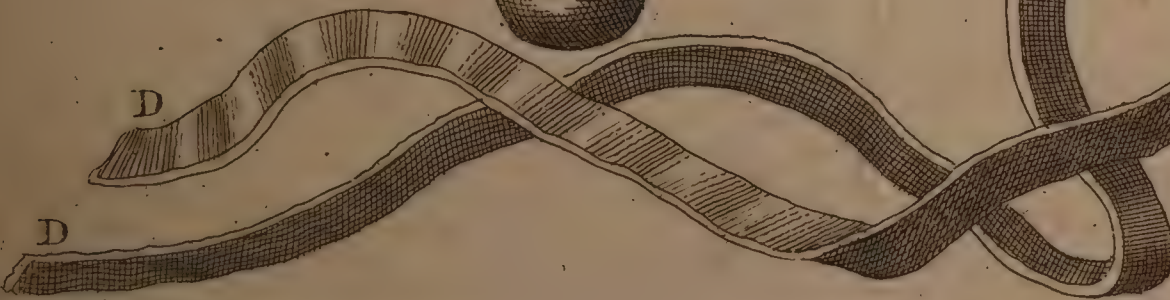
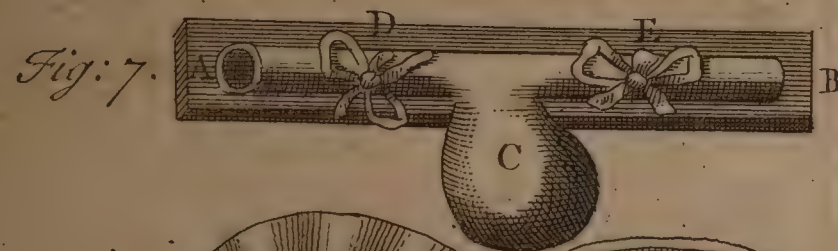
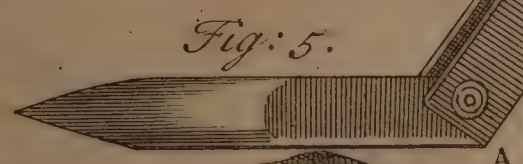
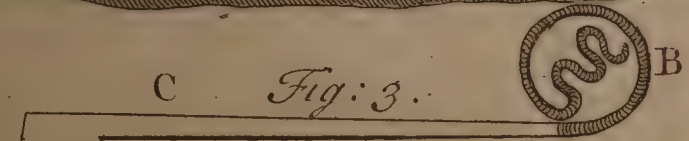
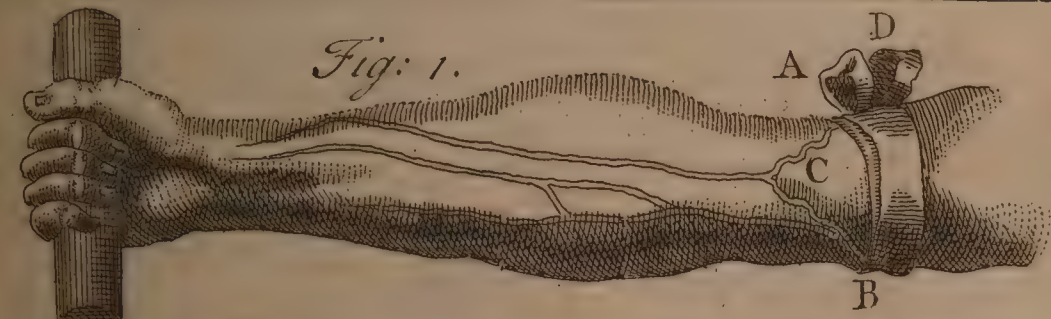
XVII. If within a few Days after the Operation the Patient is seized with an Inflammation or Fever, from the intense Heat and increased Motion of the Blood, Threatning an Hæmorrhage or a Gangrene in the affected Arm, he must then be instantly bled in the other Arm. In the mean time a cooling Regimen and Medicines are to be used, and Phlebotomy again repeated in Proportion to the Patient's Habit and the Urgency of the Symptoms. The Diet should be light, spare, and cooling, consisting chiefly of small Broths and diluent Suppings; industriously avoiding all hard and stimulating or heating Food, as is usual in large Wounds and other Inflammations.

Agglutina-
tion of the
Wound.

XVIII. When the Orifice of the Artery is closely consolidated or united, which in common Aneurisms usually succeeds in ten Days or a Fortnight's Time, your Business is then to agglutinate or heal up the external Wound in the Integuments, by treating it either with dry Lint or vulnerary Balsams: Observing in the mean time to make the Patient gently bend and extend his Arm at Intervals. Without this Precaution he may be troubled with an obstinate Rigidity or Stiffness of the Joint and an Incurvation of the Arm: Partly for want of attenuating and dispersing the Synovia, or Mucilage of the Joint, by repeated Motions; and partly from not stretching or extending the Cicatrix as it becomes gradually formed and more indurated.

PURMAN'S
Method of
operating.

XIX. Another Method for curing Aneurisms is, by fixing the Tournequet on the Arm, as we before directed: Then making an Incision through the Integuments, without touching the Aneurism, and having freed the disordered Artery from its Adhesions to the adjacent Nerves, it is then elevated by a Hook sufficient to pass a crooked and obtuse-pointed Needle under it, or our Instrument, *Tab. VIII. Fig. 4.* armed with a double-waxed Thread. By the tying of which Thread the Artery is constricted or closed; but in such a Manner that you must always place a small Compress of Lint upon the Artery under the Knot, lest it should cut or break through the Coats of that Vessel. The Artery being thus tied above and below the Aneurism, the Tumor is next laid open by Incision betwixt the two Ligatures, its Contents discharged, and the Wound then treated as we before directed in *N. XVI. & seq.* And this last is the Method PURMANNUS followed in the Cure of that large Aneurism which he mentions, *p. 212.* of his *Chirurgia curiosa*, completing the Cure, and healing up the Wound within the Space of a Month. We have given the Figure of this monstrous large Aneurism in *Tab. IX. Fig. 6.* partly for its Uncommonness, and to illustrate



illustrate the Nature of the Disorder; and partly to refute the Opinion of GOVEIUS^a, viz. That a true Aneurism never exceeds the Size of a Chestnut.

XX. The third and last Method of performing the Operation for the true Aneurism, is, by returning or pressing back the Blood out of the Aneurism into its corresponding Artery (which in large Aneurisms, where the Blood is very much concreted, is a thing impracticable^b) where this can be effected, the Tourniquet is applied to the Arm, and a longitudinal Incision made through the Integuments as before, without at all injuring the Aneurism itself by the Scalpel. This done, and the Artery freed from its Adhesions to the Nerve and Parts adjacent, it is then compressed by Ligature with a Needle and Thread as before; only without making any Incision in the Artery afterwards: By which means the Blood is prevented from returning into the Aneurism or distended Part of the Artery. You are then to treat the Wound with Digestives, as before, till the Ligatures and morbid Part of the Artery are cast off spontaneously; after which you may heal and cicatrize as we before directed. This is the Method by which ANELIUS^c happily cured a very dangerous Aneurism within the Space of a Month, at *Rome*. This he prefers, as one may hereby avoid the making a large Wound and Cicatrix, which are the constant Attendants of opening the Aneurism by Incision, and discharging its contained Blood, either by the Fingers or Instruments, which greatly protracts the Cure of the Disorder, as well as renders it more painful, and attended with a disagreeable and uneasy Scar. After the Operation is performed as above, ANELIUS bled the Patient four Times in the opposite Arm; and indeed repeated Phlebotomy is recommended by all the other *French* Surgeons who have treated on this Disorder. But though such repeated Bleeding may be of great Service in abating the Motion and *Impetus* of the Blood, in their warm Climate and Constitutions: Yet, in our more northern or colder Countries or Constitutions, I think it may be very well omitted; as it would too much weaken the Patient, and as I have happily cured several Aneurisms without it.

A third Method by ANELIUS.

XXI. If, as I have sometimes observed, the Coats of the true Aneurism should burst spontaneously, so as to extravasate the Blood, it then degenerates into a spurious Aneurism, for which there is no Cure but by the Knife. Here therefore you must first of all apply the Tourniquet to compress the Artery and prevent an Hæmorrhage; you must then make an Incision through the Integuments sufficient to discharge what concreted Blood may have been extravasated and intercepted. Which done, and the Wound well cleansed, you must secure the Artery with a Needle and Thread, as in the true Aneurism; dressing and healing up the Wound as we have before largely directed.

Treatment of the spurious Aneurism.

XXII. Whenever you meet with the brachial, cubital, or tibial Artery, wounded either by a Dart, Sword, or other Instrument, so that the Hæmorrhage thence proceeding cannot be suppressed, either by Bandage or Remedies, there is then no Method of saving the Patient so certain and expeditious as this here proposed for Aneurisms. You ought first to apply the Tourniquet, then denude the Artery; and, if it be very small, to treat it with Caustics or Astringents:

The Ligation of other Arteries in the same Manner.

^a See his *Chirurg.* pag. 23. 1.

^b And therefore when the Blood cannot be returned out of the Aneurism, this Method will not succeed, but one of the former must be used.

^c See ANELIUS's *Suite de la nouvelle Methode de guerir les Fistules lacrimales*, pag. 257.

gents: But if large, to secure it by Ligature with a Needle and Thread, as we before directed. For I may, without boasting, declare, many are the Patients that have, with my own Hand, been by this means as it were snatched from the Jaws of Death. I have even recovered those by Ligature, who have been almost spent and exhausted, so as to look like Death, through the fruitless Attempts of the Surgeons, continued for ten or twelve Days together by Styptics and tight Bandage, which had occasioned their Limbs to swell to an enormous Size. But whether or no this Method will succeed so as to save the Limb, in Wounds of the large crural Artery, I have never yet had an Opportunity of experiencing, nor did I ever hear or read of it attempted by others.

Aneurisms
in the Head,
Hands, and
Feet.

XXIII. In the Method we have here prescribed, you ought also to treat other Aneurisms, when they are curable: Which may be determined, partly from considering the Size and Situation of the Artery, and partly from the Size and Nature of the Aneurism itself. But, for the Sake of Beginners, I shall be a little more particular in my Account of other Aneurisms, and the rather, because it is a Subject of which most of our modern Surgeons take little or no Notice. And first, an Aneurism of the Artery betwixt the Thumb and Fore-finger, occasioned by a Puncture from a Penknife, was cured by Compression, as we are told by TULPIUS (*Lib. IV. Obs. 17.*) Which Compression he made by applying first, an astringent Plaster, over that a Plate of Lead, and then by a strict Bandage, having first returned the Blood out of the Tumor; the Disorder was cured within the Space of four Months. The same Treatment of Compression may be therefore used in most other Aneurisms, especially those which are recent, and not large, after having first returned or discharged the Blood contained in the Aneurism. A Woman struck her Son, of seven Years old, such a Blow on the Left Side of the Head with a Stick, that, by contusing the carotid Artery, a throbbing Tumor was instantly formed, about the Size of a Hazle Nut; which, in the Space of eight Days Time, grew so large as to cover half of his Head, from the sagittal Suture all over the Temple and Forehead to the Eye. Upon her coming for Advice, it was thought proper by the Surgeons to prefer the Operation, though a doubtless Remedy, rather than leave the Patient to the more certain Hazard of his Life. The Tumor was therefore laid open by the Scalpel, the contained Blood discharged, and the Wound dressed with Astringents and tight Bandage: By which means the Patient recovered in a short Time^a. Thus also was cured an Aneurism of the Artery behind the Ear, in Process of Time, though with much Difficulty, by the Use of Astringents and tight Bandage^b. If an Aneurism should arise near the Ankle, like that described by RUYSCH, *Obs. XXXVIII.* which was opened by an imprudent Operator for an Abscess, you ought either to make an Incision through the Integuments and Tumor, and to apply Astringents with a tight Bandage; or else to denude the Artery, and secure it by Ligature with a Needle and Thread, as we directed before. Hence you may be also able to treat Aneurisms formed in any of the other accessible Arteries of the Body, where there is any Prospect of obtaining a Cure. HARDERUS *Apiar. Obs. p. 325.* takes Notice of a Patient's sudden Death, from opening an Aneurism of a carotid Artery in the Neck: And

^a See BARTHOLIN. *Epist. Med.* 53. Cent. III.

^b *Ephemer. Nat. Curios.* Cent. III. *Obs. LXVI.* pag. 156.

VAN HORN has observed the same from an Apertion of an Aneurism in the Thigh.
Vid. Epist. de Aneurismate.

XXIV. They who desire a better Idea of the Manner in which the Ligatures Some Observations on the D. folder. are to be made upon the Artery for an Aneurism, may inspect *Fig. 7.* in our ninth Table, where A denotes that Part of the Artery above the Aneurism, B the Part below, C the Aneurism itself, D the superior Ligature, and E the inferior one. But here we may again observe, that when the Tumor is on the Flexure of the Arm, the lower Part of the Artery should not be tied with a Ligature, except it be absolutely necessary, for the Reasons we before alledged. But in what Manner the Circulation of the Blood is carried on through the Hand and lower Parts, after the Operation, I cannot conceive, especially when there is but one Trunk^a of the brachial Artery near the Elbow; as must have been the Case with the Patient of ANELIUS, because no Blood returned by the lower Part of the Artery, after its Division, into the Tumor, notwithstanding he did not secure it by Ligature. We must therefore defer our Inquiry on this Head, till some body may have an Opportunity of examining the Arm of a dead Subject who has undergone this Operation in his Life-time. Dr. WALTER HARRIS, in his Eighth Chirurgical Dissertation, openly condemns this Operation, and calls it dreadful and rash Butchery: But for what Reasons himself best knows. He seems, in my Opinion, to have been a very timorous Physician, who, out of Fear, or a foolish and ill-grounded Compassion, is for rejecting some of the most considerable and useful Operations in Surgery: Without which, it will be impossible for the Patient to obtain a Cure, or even to survive any Time.

C H A P. XIV.

Of injecting Liquors into the VEINS, and of transfusing the Blood of one Animal into another.

I. **W**E treat next of *Injecting* and *Transfusing*, as a Branch of Surgery: Because those Operations require the Apertion of a Vein, in the same The Operations described. Manner as in Bleeding. The first is, the injecting some Liquor or Medicine into a Vein opened by Incision: And the last is, the conveying the arterial Blood of one Man, or Animal, into the Veins of another. Notwithstanding these Operations are seldom practised by our modern Surgeons, yet they were highly celebrated, and often performed, in the last Century, from the Year 1660 to 1680: And therefore we shall not think much of our Endeavours here, to give the young Surgeon a clear Notion of the Affair, from whence he may also be able to understand what Reasons gave Occasion for the first Invention and Perfor-

^a I have often found two Trunks, or large Branches of this Artery, one situated in the inward, and one in the outward Part of the Arm; which below the Flexure of the *Cubitus* communicated again. But most Anatomists have described one only.—See my Dissertation on a dangerous Wound of the crural Artery.—Many Surgeons, unacquainted with this Particular in Anatomy, have taken off the Patient's Arm, where there was no Occasion, and often endangered his Life.

mance thereof; and what Advantages may be perhaps reasonably expected from the same Operations, even at this Time.

Uses expected from them.

II. The Generality of Physicians, not without Reason, attribute most Disorders of the Body to some Vice in the Blood. Therefore what Method can be more ready to remove or correct that Vice, than injecting a proper Medicine into the Veins to mix with the Blood itself, or the transfusing the sound Blood of one Man or Animal into the Veins of another, instead of that which is diseased. For by this means the Action of a Medicine on the Blood will be immediate and entire, without being impaired or changed by passing the Stomach and Intestines, and mixing with various Juices before it arrives to the Veins. But there are even many Cases which occur, wherein no Medicine at all can be taken by the Mouth, as in Apoplexies, Anginas, the *Hydrophobia*, &c. which may possibly be this way remedied, when they cannot by any other. And if plentiful Bleeding is so serviceable in many Disorders, as the Leprosy, Gout, Epilepsy, Apoplexy, Consumptions, Scorbutus, Venereal Disease, malignant Fevers, &c. by discharging the peccant Matter in the Blood, as it is by many Physicians allowed: Even the Objections of other Physicians against it, as weakening the Patient, &c. may, by these Operations, be obviated or removed. Even old Age may be supported, and the very worst Habits of Body corrected by these Means, so as to give a firm, juvenile, and healthy Constitution. These, and such like, are the vast Expectations which have been formed from the present Operations by Physicians: But the Misfortune is, that they not only meet with Disappointment in their good Views, but even frequently the Event turns out worse than the Disease. For almost all the Patients who have been this way treated, have degenerated into a Stupidity, Foolishness, or a raving or melancholy Madness, or else have been taken off with a sudden Death, either in or not long after the Operations. These lamentable and fatal Consequences have brought the Art of Injections and Transfusions into Neglect at the present: So that, being suspected and condemned by proper Judges at *Paris*, where they most flourished, we are told they were in a little Time prohibited by a public Edict of that Parliament.

The Art of Injection described.

III. Notwithstanding this, we shall give the young Surgeon an Idea of the Manner in which Liquors were formerly, and may now be injected into the Veins of living Men, or other Animals. And first, a Vein is to be opened, usually in the Arm, by your Lancet, as in Bleeding: And having introduced the small Pipe of a Syringe, or a very small Clyster-pipe with a Bladder (*Tab. XI. Fig. 10.*) the contained Liquor is injected or forced into the Vein upwards towards the Heart. Which done, you are to dress the Orifice, and make your Deligation upon the Arm in the same Manner as after Phlebotomy. But whether or no this Method of injecting proper Medicines into the Blood may succeed, especially in desperate Apoplexies, Anginas, *Hydrophobia*, &c. and whether it may not be often useful to discharge the morbid Blood, and transfuse such as is sound, or warm Milk or Broth in its stead, ought, in my Opinion, to be determined by future and repeated Experiment. PURMANNUS, in his *Surgery*, (*Part III. Cap. 31.*) tell us, that he has not only performed the Operation with Success on others, but also very happily upon himself, being by this means cured, not only of a troublesome Itch, but also of a stubborn Fever. A professed Treatise on the Subject has been published by ELSHOLTZ, intitled, *Clysmatica*

tica Nova, sive Chirurgia infusoria & transfusoria, 8vo. 1667. Editio secunda, cum Fig.

IV. For the Transfusion of Blood into the Veins, you are first to open a Vein in the Patient's Arm or Hand, as at *Fig. 11* and *12. Tab. XI.* and then thrust gently upward into it a small Tube of Silver, Brass or Ivory. The same is to be also done with the sound Person; only the Tube must here be inserted downward towards the small End of the Vein. This done, the smallest of the Tubes is to be inserted into the other larger one, by which means as much Blood will pass from the sound Person into the Patient as may be thought proper, and then the incised Veins are to be dressed or bound up as in Bleeding. But if the Patient does not recover after one Transfusion, the Operation should be repeated again at convenient Intervals. But before the Patient receives the Blood of the sound Person, he ought to be bled proportionably, that the new Blood, last received, may have the freer Circulation. Sometimes a Vein is opened in each Arm of the Patient at the same Time, that as much of the vitiated Blood may flow out of one Orifice as he receives of the sound by the other. For more on this Subject, among others, the Reader may consult LAMZWARD in *Notis ad SCULTETUM*, and JUNGKEN *Chirurg. Germanica*, pag. 487. where you have Figures of the Operation. If the Blood is to be transfused out of some Animal into the Patient, then a Calf or a Lamb, for Example, are to be secured by Ligatures, and one of their Veins or Arteries opened, either in the Neck, Leg, or Thigh; and the rest of the Operation managed as before. See *Tab. XI. Fig. 13.* and LAMZWARD in *Append. ad SCULTETI Armament. Chirurg.* and BURMANNI *Chirurg. P. III. Cap. 31.* Lastly, where Tubes of Metal or Bone were found painful and less convenient, for want of being flexible, Operators contrived to fasten an intermediate flexible Pipe betwixt the two others, such as Part of the carotid Artery, or of the Ureter from an Ox, Calf, or Lamb, or the Wind-pipe of a Capon, Duck, &c. by which means the Process becomes much facilitated both to the Operator and Patients.

The Method
of Transfu-
sion.

V. The Contrivance of this Artifice, by which the Blood of one Animal is transfused into the Veins of another, is assumed by Dr. LOWER, in his Treatise *De Corde*, in opposition to M. DENIS, who, in his *French Epistle* upon this Subject, claims the Invention to himself. It is true, the latter made many Experiments in this Way at *Paris*, but with very bad Success. STURMIUS, once a celebrated Professor of the Mathematics at *Altorf*, and VERHIUS, Professor at *Francfort*, attribute the Invention to MAURIT. HOFFMAN: Whereas MUYS asserts, that LIBAVIUS described the Process at large in the Year 1615, but without telling us the Book. The first Injection of Liquors into the Veins of Animals is generally attributed to the celebrated Sir CHRIST. WREN; but I think we have this Artifice described before him, by a Professor of Physic, in a Treatise published *An. 1664*, in which he explains the Process that had never before been heard of in *Germany*. They who desire more on this Subject may consult MAJORIS *Lib. de Chirurgia infusoria*, ETMULLER *Disputat. in eod. Argumento conscript.* ELTSHOLTZ *Clysmatica nova*, PURMANNUS *Chirurgia*, LOWER *De Corde*, SANTINELLUS in *Confusione Transfusionis*, MANFREDUS *De Sanguinis Transfusionis*, STURMIUS in *Philosophia Ecclē. Diff. X.* MERCKLINUS *De Ortu & Occasu Transfusionis Sanguinis*, LAMZWARD in *Appendice ad SCULTETUM*, pag. 29.

The Inven-
tion of this
Art.

For Injections into the Veins in desperate Diseases, See *Misc. Nat. Cur. Ann.* IX. and X. *pag.* 144. and *LOWTHORP Phil. Transact. Abr.* Vol. III. *page* 226 to 235.

An EXPLANATION of the ELEVENTH PLATE.

- Fig.* 1. Represents an Arm in which a Vein is to be opened: A denotes the Cephalic Vein, B the Basilic, and C the Median Vein; D the Ligature fixed above the Elbow to make the Vein swell.
- Fig.* 2. Represents the several Forms of incising a Vein with the Lancet: A shews a longitudinal Incision, B a trasverse one, and C, D, oblique ones.
- Fig.* 3. Exhibits the antient *German* Phlebotomus or Fleam for opening a Vein, A the sharp Point to be fixed on the Vein, B the Handle to be held in one Hand, while the Part C is struck by a Fillip of the Finger of the other Hand, so as to drive the Point A into the Vein.
- Fig.* 4. Is a Spring-Fleam, now in Use with some. The Part A being fixed on the Vein, and the Part C being elevated, depresses the Spring by the End B, which by its Reaction or Elasticity strikes the End C upon the Fleam A, so as to drive it into the Vein. DD is a hollow Case of Brass or Silver, in which the Spring-Part of the Instrument B is included.
- Fig.* 5. Represents the *French* Phlebotomus or Lancet, bent so as to form an obtuse Angle, as it should be, for the more convenient holding it in Bleeding.
- Fig.* 6. Is the great Aneurism, as big as one's Head, observed by PURMANNUS in an Arm near the Joint or Bend of it.
- Fig.* 7. Shews the Manner of applying the Ligatures above and below an Aneurism, in the Operation for that Disorder. A B the Artery, C the Aneurism, D the Upper Ligature, E the Lower Ligature.
- Fig.* 8. Exhibits an Instrument contrived both for the Prevention and Cure of Aneurisms. A A A denote the Plate of Iron or Steel adapted in Form to the Flexure of the Arm, B its Fissure, CC Ligatures fastened to the Ends A A, and extended to D D. E denotes a moveable Steel Plate, joined by the Hinge I, and covered with a Cushion of Cotton or Silk at F, to be fixed upon the Aneurism, G G are two small Hooks by which the Instrument is fastened upon the Arm by the Ligatures C C D D, H is a Screw by which the Plate and Cushion E F are pressed down upon the Tumor.
- Fig.* 9. Represents an Instrument of the same Kind with the former, but of a different Shape. Here the Plate and Cushion E F are larger, for bigger Aneurisms than the former. Its Parts and Explanatory Letters correspond to those of the preceding Figure.
- Fig.* 10. Shews the Apparatus with a Bladder and Tube for Injection of Liquors into the Veins: A the Bladder and Tube, B a Vein of the Arm opened, in which the Tube is inserted.
- Fig.* 11 and 12 Exhibit the Transfusion of the Blood from the Veins of one Man into those of another: B denotes the recipient, and A the remittent Arm.
- Fig.* 13. Shews the Transfusion of Blood from the crural Artery or Vein of an Animal into the Arm of a Man by the Intervention of the Tube A.

CHAP. XV.

Of INOCULATION for the SMALL POX.

I. **T**HE Art of ingrafting or propagating the Small Pox by Incision or Inoculation, has been an Operation equally famous in all Nations with those in the preceding Chapter. Therefore we shall, for the Sake of Beginners, describe the Process of it, which under proper Circumstances may be of great Service to Mankind. The Design of this Chapter.

II. The Design of this Operation is, to communicate, by Art, a milder Species of the Small Pox to the Infant or adult Patient, than that received by the natural Infection: and this by ingrafting some of the variolous Matter. In order to which a small Incision^a is to be first made with a Scalpel or Lancet through the Skin of the Arm, and having inserted a small Particle of the purulent Matter taken from a mild Kind of the Pock, the little Wound is then to be dressed with some dry Lint, and covered with a Plaster. After the Operation, the Patient must constantly keep to his Chamber, the Air of which should be moderately warm, and his Diet regulated by some prudent Physician, by which means the Disorder will shew itself in about seven or eight Days, without any malignant Symptoms: And, if assisted by a proper Regimen and moderate Warmth, it usually runs gently through its several Stages. When the Patient has once had the Disorder this Way, though never so mild, we are assured by Experience, that they never have it again: And therefore the Opinion of those seems to be well grounded who think the Propagation of the Small Pox by Inoculation might be of general Use and Benefit to Mankind, in preserving the Lives of some, and the most important Members of others, as the Face, Eyes, Hearing, Viscera, &c. Inoculation described.

III. History informs us, that the Disorder was this way propagated many hundred Years ago among the *Greeks* and *Turks*: Whereas it is but of late Years that the *European* Nations have come into it; among which the *English* seem to have approved and followed it most. The Experiment succeeded so well in the Hands of the *British* Physicians, that the late King *George* himself countenanced the same in all his Dominions: And from thence the Practice prevailed with Success in *Germany*, particularly at *Hanover*, *Onolzbac*, and *Pyrmont*. The Operation practised by other Nations.

IV. It must, however, be confessed, that there were many, both among the *French* and *English*, who endeavoured to suppress and vilify this Practice in their public Libels, condemning it as fatal to Mankind, and unfit to be encouraged among a Christian People; but, I think, all they have objected or advanced has been long ago sufficiently answered and obviated by the learned Dr. JURIN, and other able Physicians. They who desire more particular Accounts, may consult the Dissertations published by the celebrated Physician last mentioned, as also those by PYLARINUS of *Italy*, the celebrated VATERUS of *Vitemberg*. *Aët. Erud. Lips. Ann.* 1723, 1725. *Aët. Natur. Curios.* Vol. I. Obs. LXXV. p. 133, &c. And lastly, they may consult Experience, the best Physician of all. The Objections against this Practice.

^a But Dr. HARRIS, in his *Chirurgical Dissertations*, directs only the Cuticle to be abraded, and the variolous Matter to be spread on the naked Skin.

My own Opinion of it.

V. But, for my own Part, if I may speak freely, I am so far from thinking the Practice fatal or mischievous, that I rather firmly believe it might, under a proper Management, be of the greatest Use and Benefit to the Lives and Healths of Mankind. For, if I think right, the Small Pox arises from a pestilential Virus or Matter lodged in the Blood from the very first Day of the Birth, which breaks out almost in every Person sooner or later: And the more early, usually the better. For it is very seldom we observe the Pock favourable in those more advanced in Years: So that the Matter seems to multiply itself in the Blood, and augment with the Patient's Age. And this, in my Opinion, is the Reason why we oftener meet with the Small Pox more mild and favourable in Infants than Adults. If therefore the Disorder be procured of a mild Kind by this Operation, and the Blood cleared of its latent Virus, while small in Quantity, and the Infant young, I doubt not but many, and especially the Children of Princes and Nobility, might be thus not only preserved from Death, but even conducted safely through the several Stages of the Disease, without the Insults of its most malignant Symptoms. We are convinced by Experience, as well as Reason, that the Disorder which breaks out from a natural Infection is generally more severe and fatal than that procured by Art: And no Wonder it should be so; since in the last the Physician has an Opportunity of chusing the most favourable Season, and of preparing his Patient beforehand by a proper Regimen, Diet, and Medicines.

CHAP. XVI.

Of SCARIFICATION and CUPPING.

The Method of dry Cupping.

I. Scarification and Cupping was an Operation frequently performed by the most antient Surgeons and Physicians^b, notwithstanding the Moderns have, by their Pride or Neglect, turned the Business over to those who attend the Baths or Hot-houses. Yet, as it makes none of the least Operations in Surgery, we shall here briefly consider and explain the same. The Operation of Cupping is indeed vague, and not confined to any particular Member of the Body. But whenever the Cupping-glass is applied, it is fixed upon the Skin, either entire or scarified: And hence we have a twofold Distinction of Cupping into *dry* and *gorey*. The Figure of the Cupping-glass, for either of these Purposes, is represented in *Tab. XII. Fig. 1.* In dry Cupping, the Glass adheres to the Skin by expelling or rarifying its included Air by lighted Flax or the Flame of a burning Candle within it, so that the Glass is pressed upon the Part with a considerable Force by the external Air; in which Artifice our ordinary Cuppers are sufficiently well versed. The Use of this dry Cupping is twofold; either to make a *Revulsion* of the Blood from some particular Parts affected, or else to cause a *Derivation* of it into the affected Part upon which the Glass is applied. Hence we have a Reason why HIPPOCRATES^b orders a large Cupping-glass to be applied under the Breasts of Women who have a too profuse Discharge of their Menfes, intending thereby to cause a Revulsion of the Blood upwards

^a As we read in HIPPOCRATES, CELSUS, GALEN, &c.

^b Sect. V. Aphor. 50.

from the Uterus. And upon the same Principle I have myself successfully cured a profuse Hæmorrhage at the Nose, and an Hæmorrhage or Spitting of Blood from the Lungs, by applying Cupping-glasses to the Legs and Feet, particularly about the Ancles and Knees. SCULTETUS give us a remarkable Instance in *Obs.* 85. of a Woman, who, by the repeated Application of six Cupping-glasses (without Scarification) to her Thighs, was not only relieved of the troublesome Symptoms, caused by an Obstruction of her Menfes, but was also thereby freed from the Obstruction itself. Dry Cupping is also used with Success to make a Revulsion by applying the Glasses to the Temples, behind the Ears, or to the Neck and Shoulders, for the Removal of Pains, Vertigos, and other Disorders of the Head. ^a They are also applied to the Upper and Lower Limbs to derive Blood and Spirits into them when they are paralytic; and, lastly, to remove the Sciatica and other Pains of the Joints. ^b The Operation is, in these Cases, to be repeated upon the Part till it looks very red, and becomes painful.

II. But Cupping is much oftener joined with Scarification, than used alone with us in *Germany*, and in other northern Countries: In which Case, the Part is first to be dry cupped till it swells and looks red, and the Skin is to be punctured or incised by the Scarificator, *Tab.* XII. *Fig.* 2. with which you may make sixteen or twenty small Wounds in the Skin, close enough to each other to be covered by the Cupping-glass, into which the Blood ought to flow from them. (*See Fig.* 3.) In repeating these Incisions, and re-applying the Cupping-glass upon fresh Parts of the Skin, the Operator must observe to begin at the lowest Part, and thence ascend gradually, that his Work may not be obscured by the reflux Blood from above. Having scarified the Skin, and applied the Cupping-glass with Fire, as before directed, the latter will adhere firmly to the Part, and the Pressure of the external Air will force a considerable Quantity of Blood into it from the Incisions. But as several Glasses (sometimes six or eight) are often applied at one and the same Time, and to different Parts of the Body, the Operator must manage his Business so that some Glasses may be filling, while he is scarifying and adapting the others: And in thus shifting them alternately, he must pour out their Blood into a Pan or Vessel, wash them in warm Water, cleanse the Skin with a Sponge dipped in the same Water, and then apply the Glasses as before. When the Blood ceases to flow fast enough, you must repeat your Incisions with the Scarificator close by the former, and re-apply your Cupping-glasses till a sufficient Quantity of Blood is drawn, or till it stops of its own accord. Your Operation being finished, and the Skin well cleansed with a Sponge and warm Water, it is next to be rubbed over with a Bit of Deer's Suet to promote the Healing. But if the Blood still continues to flow, which it does but seldom, you are then to wash the Skin with *Sp. Vini, Aq. Reg. Hungar.* binding it up with a Compress and Bandage.

Cupping
with Scarification.

III. The modern Surgeons have, for Conveniency to themselves and Ease to the Patient, contrived a Scarificator, different from the last mentioned, which consists of sixteen small Lancet-blades fixed in a cubical Brass Box, with a Steel Spring, as at *Fig.* 4. *Tab.* XII. When the Side of this Instrument marked CCCC is applied to the Skin, and the included Spring bent by the Lever A, by depre-

The modern
Scarificator.

^a See CÆLUSUS, *Lib.* iv. c. 2.

^b See DECKER'S *Exercit.* p. 34.

pressing the Button B, it is so suddenly let loose as by its Force to strike the Points of the sixteen Blades out of the Case at one Instant into the Skin, making as many small Incisions at once in their regular Order, over which the Cupping-glass is to be applied, as we before directed. We meet indeed with the Figure of a Scarificator not much differing from this in PAREY's Surgery, *Book XI. Chap. 5.* and after him in LAMSWARD's Notes to the *Armamentarium* of SCULTETUS. But they do not propose the Instrument for other Uses than to scarify the unsound Parts in an incipient Mortification: Whereas this is used with good Success by our Cuppers in many other Diseases, as I myself have frequently seen and experienced. Though M. GARENGEOT^a condemns it as a bad and useless Instrument: But perhaps that Gentleman never saw the Use and Effects of it.

Uses of Scarification.

IV. Cupping with Scarification is used in various Parts of the Body, particularly in the Head, Neck, Shoulders, behind or under the Ears, Occiput, Back, and Loins, Legs and Arms, and near the^b Ancles: And this for making a Derivation, Revulsion, or Evacuation in the various Disorders incident to plethoric Habits; such as various inflammatory Disorders in the Head, Eyes, Ears, Tonsils, and Uvula, particularly violent Head-achs, Ophthalmias, Amauroses, Suffusions, &c. In all which Cases it is hardly possible to express the general Benefit which may be received from this Operation, especially when timely used, and judiciously repeated at proper Intervals. Nor is Scarification much less beneficial than Phlebotomy in those Patients, whose Veins are so small or obscurely situated, that it would be dangerous opening them by the Lancet: Yet as it is often absolutely necessary to make a Discharge of Blood some way from them, I have often advised this Method to be followed, and with good Success. The excellent Anatomist MORGAGNI^c advises Scarification upon the Occiput in Apoplexies, and all soporous Affections, as one of the best Remedies that can be recommended, either from Reason or Experience: Because in this Way the hestitating Blood may be discharged from the obstructed Veins of the Brain, which communicate with those of the Occiput, or at least it may, by this means, obtain a more free Motion: But then you ought to scarify deep, as he observes. Scarification and Cupping upon the Occiput is also extremely useful in an Ophthalmia, or Inflammation of the Eyes, and a like Discharge procured by deep Scarification upon the affected Side in a Pleurisy, after Phlebotomy premised, gives great Relief, according to LANCISI^d. Lastly, this Method of evacuating by Scarification and Cupping, makes one of those which are generally repeated at stated Seasons of the Year, like Bleeding and Purgings, Spring and Fall, &c. which the Patient being once accustomed to, ought never to neglect them, for fear of incurring their former, or even worse Disorders.

Scarification by some rejected and despised.

V. I must indeed own, that there are many among our Physicians and Surgeons who condemn this Operation as of little or no Efficacy: And the Reason which they offer is, that hereby only that Blood is discharged which lodges itself betwixt the Flesh and Skin. But this Judgment seems too hastily formed, and

^a Traët. *De Instrument. Chirurg.* Tom. I. pag. 413. ^b Scarification of the Ancles is highly recommended by Jo. TAC. MANN, of Padua, in a Treatise, published A. 1583. ^c *Adversar. Anatom.* V. pag. 83. & VI. pag. 108. ZACUTUS LUSITANUS also mentions a Patient freed from an Apoplexy by repeated Scarification. ^d *Ibid. Advers. Anat.*

without a just Foundation. For Experience hath taught myself and many other eminent Physicians, that as much and as thick Blood may be discharged by Scarification and Cupping, as by Phlebotomy, and consequently it must be little less, if not equally beneficial, in all those Disorders which require Bleeding. But this I can boldly affirm, from my own Reason and Experience, that in some Cases Scarification excels Phlebotomy, in as much as the Cupping-glass, by firmly adhering to the Skin, not only draws out the Blood, but also gives it a greater Impetus or Tendency towards the scarified Part; and therefore it constantly gives certain and speedy Relief in most Disorders of the Head, Eyes, and Ears, Apoplexies, sleepy Disorders, Inflammations of the Tonsils, Hæmorrhages, and Pains of various Kinds, &c. sometimes by Revulsion, and sometimes by Derivation.

VI. There are again other Physicians, who imagine Scarification to be not only useless, but even pernicious: For, say they, We have Instances of Patients who have been not only violently disordered, but even killed by the Operation being performed at an improper Time, or with an unclean or infected Instrument. ^a Thus a Patient may be in danger of catching some foul Disorder by being scarified with an Instrument that has not long before been used upon one infected with the Leprosy, Pox, Itch, &c. for thus the Infection will be inoculated almost in the same Manner with the Small Pox ^b. But if Scarification must be condemned and rejected on this Account, so must also Phlebotomy and many other Operations, in which the same Instrument is applied that has been used before. But that the Patient may have no Uneasiness from this Quarter, it may not be improper for him to see that his Cupper's Scarificator and Apparatus are very clean: Or else they may keep a Scarificator of their own, which being kept clean and dry, can give no room to make any frivolous Scruples of this Nature.

Whether
Scarification
be dangerous.

VII. There still remains another Sort of Scarification, used by Surgeons in violent Inflammations, incipient or confirmed Mortifications, pestilential Carbuncles, and the like. In which Cases it has been found highly serviceable to discharge the stagnant and vitiated Blood, by making many small Wounds or Incisions in the Skin with a Scalpel or Lancet, though without the Assistance of Cupping-glasses. This Kind of Scarification is usually denominated *Chirurgical* by the Cuppers, in Contradistinction to theirs: As Surgeons use it frequently in Gangrenes and Mortifications, and sometimes in swelled Legs and Dropsies, especially that of the *Scrotum*, and sometimes for the *Hydrocephalus*. But though it may be sometimes highly necessary to scarify the Legs of dropical Patients, when the Skin is distended so as almost to burst: Yet it ought not to be made indiscriminately, without absolute Necessity, and a proper Regard to the Patient's Age, Habit, &c. Otherwise it is even probable, that the scarified Part will gangrene or mortify, and destroy the Patient. PLINY (*Hist. Nat. Lib. LXXVIII. Cap. 1, & 11.*) recommends Scarification of the Gums for the Tooth-ach; which, in my Opinion, may not unfrequently be very useful.

The Scarification used
by Surgeons.

^a Thus HILDANUS, *Cent. V. Obs. 71.* remarks, that a Palsy arose from hence, though it might proceed from a Multitude of different Causes.

^b *Vid. JORDANUS De lue nova in Moravia. SPORICHIUS De Symptom. Crudel. a Scarificatione. LIBERIUS De malitiosa scarificatione, in Obs. GREG. HORSTIS, L. IV.*

The Egyptian Scarification.

VIII. Related to Scarification is the Infliction of small Wounds within-side the Nose, Lips, Ears, and Gums, used by the *Egyptians*, and recommended by ^a CELSUS and ^b ARETÆUS for abating Inflammations, and relieving various other Disorders, in which it very often succeeds admirably. At which we need the less wonder, if we consider what Relief Nature herself often gives the Patient, by making a plentiful Hæmorrhage at the Nose, in ardent Fevers, Head-achs, &c. Add to this, that the *Egyptians*^c had a Practice of beating or whipping the Calves of the Legs with Rods, till they looked red, and then scarifying, or making Incisions in the Skin: By which means they procured Relief, and made useful Revulsions from the Head and Brain in violent inflammatory Disorders of those Parts, and in Fevers with Delirium, Watchings, &c. But notwithstanding the Usefulness of this Practice, it is at present hardly so much as known among our *European Nations*.

Scarification of the Eyes.

IX. Many of the antient Physicians and Surgeons, with HIPPOCRATES, had a Practice of scarifying the Insides of the Eyelids, and even the Eyes themselves, with a proper Instrument for the Purpose, in many of the Disorders which infest that Organ, as is very apparent from the Treatise which HIPPOCRATES has left, *De Visu*^d. This Operation of scarifying the Eyes, though neglected from the Time of HIPPOCRATES, has yet been renewed, or lately introduced again, by the *English* Oculist WOOLHOUSE, at *Paris*: And it has been also performed with tolerable Success by some others of the present Age, as we have Accounts. But for the Instruments, and Manner of performing this Operation, we shall be more particular in our following Account of the Operations for the Eyes.

CHAP. XVII.

Of BLEEDING by LEECHES.

Choice of the best Leeches.

I. LEECHES, or *Sanguisugæ*, are a Species of aquatic Worms or Insects, of the Shape represented in *Tab. XII. Fig. 5.* which being applied to any Part of the Body, bite through the Skin, and extract Blood from the small Veins, which frequently conduces much to the Health and Recovery of a Patient: For which Reason they have been used from the most early Times by the antient *Greek* and *Roman* Physicians, as may be seen in GALEN's professed Dissertation on this Insect, commented on by SEBEZIUS. As there are Leeches of different Kinds and Natures, it will first be proper to distinguish and make a due Choice of the best. These are always found in clear Brooks or Rivulets: Whereas those taken from Lakes, Fish-ponds, and stagnant Waters generally have something malignant in their Bite, insomuch as sometimes to excite great Pain, Inflammation, and Tumor in the Part, and Uneasiness in the whole Body.

^a *Lib. IV. Cap. 2.* where he directs to draw Blood from the Nose in violent Head-achs.

^b *De Chron. Morb. Lib. II. Cap. 11. De Cephalia*, pag. 128.

^c PROSP. ALPINUS, *Medicina Ægyptior.* p. m. 72. where you have a Figure of this Practice.

^d CELSUS likewise advises Scarifications in the Head for many Disorders of the Eyes, and particularly violent Inflammations, *Lib. VI. Cap. 6.* The Success of which I myself have experienced.

It is also an Observation made by some of the most expert Surgeons, that the best Leeches have slender and pointed Heads, with greenish and yellowish Lines or Streaks on their Backs, and their Bellies of a reddish yellow: Whereas those are the worst, or most malignant, which having a thick and obtuse Head, and incline from a dark blue to a black Colour on the Back and Sides. But you ought to observe it as a necessary Caution, never to apply Leeches which have been lately caught in Rivers or foul Waters, before they have been kept some time in a Glass full of clean Water, to be often shifted, that they may cleanse themselves from what Filth or Venom they may have imbibed: And when they have been thus kept for a few Months, they may be afterwards safely used, without incurring any bad Accident.

II. Before the Leech is applied to the Skin, it should be taken out of the Water to stand about an Hour in an empty Cup, or other Vessel, to drain itself; that being thus rendered thirsty and empty, it may both adhere more firmly to the Part, and draw off a larger Quantity of Blood. As for the Part to which they may be applied, that may be on the Temples or behind the Ears, when the Disorder lies in the Head or Eyes, and especially when the Patient is delirious in a Fever, or overcharged with Blood. But sometimes they may be commodiously enough applied to the Veins of the *Rectum*, in Disorders proceeding from an Obstruction of the wonted Evacuation this Way, or in the blind and painful Piles: And by Way of Revulsion they will be here usefully applied in profuse Hæmorrhages of the Nose, and spitting or vomiting of Blood; in which Cases they are of incredible Service, especially when the Disorder arises from Obstructions of the hæmorrhoidal Flux. But before you apply the Leech, the Skin of the Part must be first well rubbed till it becomes hot and red. Which done, you take hold of the Leech by its Tail with a dry Cloth, or you may place it leaning half way over the Edge of a Cup, and so apply it that it may creep out upon the Part; which they are no sooner fixed upon, but they generally bite and draw the Blood very eagerly. When several Leeches are to be used, you must apply each of them to the Part in this Manner successively: and if they should refuse to bite or adhere to the Skin, as they sometimes do, you may, in that Case, put a little Blood of a Pigeon, Chicken, &c. upon the Skin. But if that will not allure them, you must apply fresh Leeches in their stead. The Application of Leeches to the Caruncle in the greater or inner Canthus of the Eye, is found to be extremely useful in all inflammatory Disorders of that Organ, after Phlebotomy has been first premised.

Method of
applying
them.

III. When the Leeches are distended with Blood, they generally separate from the Skin, and leave the Part of themselves. But if it be necessary to draw still a large Quantity of Blood, you must either apply fresh Leeches, or else cut off the Tails of those which are drawing with a Pair of Scissors, by which means the Blood will run through them, and they will draw almost as long as you please. If the Leeches do not separate spontaneously after a sufficient Quantity of Blood has been evacuated, upon sprinkling a little Salt or Ashes upon the Part, they usually leave it presently: Which Method should be the rather taken, because forcing or pulling them away often occasions a Tumor and Inflammation of the Part. The Operation being thus finished, those Leeches which are whole may be returned into the Glass again and reserved for future Uses: But those die which have had their Tails cut off. The Wound made by this Insect may be first washed with warm Wine or Water, and then dressed with some vul-

Treatment
after their
Application.

nerary

nerary Plaster: Though there is seldom any Occasion for the latter, as it generally heals up fast enough of itself. They who desire more upon this Insect, may consult GALEN, ALDROVANDUS, GESNERUS, BOTALLUS, PETR. PAUL. MAGNUS, SEBIZIUS, HEUNIUS, CRAUSIUS, SCHRADERUS, STAHLIUS, &c. who have wrote thereof more at large.

C H A P. XVIII.

Of ACUPUNCTURATION, used by the Chinese and Japanese.

Somewhat a-kin to Scarification is the famous Operation of the *Chinese* and *Japanese*, termed *Acupuncturation*. Those Nations rejecting Scarification and Phlebotomy as pernicious, have Recourse to their Acupuncturation and Cauterization, or burning with *Moxa*, as their most potent Remedies in almost all Disorders. The first of these Operations they perform with a large Gold or Silver Needle (*Tab. XII. Fig. 6.*) which they strike into the Flesh, either with their Hand or the little Hammer, *Fig. 7.* It is indeed more than a little surprising, that so desperate and severe an Operation should be so much practised by a People in other respects judicious: And that too, in the Head, Breast, Abdomen, Arms, Legs, Thighs, and most other Parts of the Body; even in the Abdomen of Women with Child, when the Fœtus is restless. But I do not know that the Practice has been received by any of our *European* Nations: And therefore, as the Process is so much abhorred, we shall not here give a prolix Account thereof. They who desire more, may consult RHYN *De Arthritide*, pag. 145, 183, 190; and KOEMPFER in *Amœnitatibus exoticis*, pag. 582; also in his Description of *Japan*: In which Country both these Surgeons were Spectators of the Operation.

C H A P. XIX.

Of ISSUES.

The Seat
of Issues.

I. ISSUES are little Ulcers made designedly by the Surgeon in various Parts of the Body, and kept open by the Patient, for the Preservation or Recovery of his Health. They are by some ^a denominated *Cauteria*, but improperly: Because by that Term we usually mean a caustic or corroding Medicine. In this Operation the Physician endeavours, by Art, to imitate and relieve Nature; who often forms Ulcers in various Parts of the Body of her own accord, for discharging pernicious Humours, whereby People are often freed from grievous Disorders, and enjoy a healthy State. The Parts in which Issues are generally made, are either, (1.) the upper Part of the Head; (2.) the Neck; (3.) the Arms, betwixt the Biceps and Deltoeide Muscle, near the Insertion of the

^a CAPIVACCIUS has a Dissertation *De recta Cauteriorum Administratione*, in which he treats only of Issues, which the *French* also term *Cauteres*.

last; (4.) in the Thighs, especially within-side, immediately above the Knee, in a Cavity easily felt by the Fingers; and lastly, (5.) Issues are sometimes made in the Legs, on their interior Side, in a Cavity immediately below the Knee.

II. Though there are several Methods of making Issues, yet none seem to be more ready than the following: *viz.* First, to mark the proper Place with Ink; and then elevating the Integuments betwixt the Thumb and Fore-finger of the Surgeon and an Assistant on each Side, you next proceed to make an Incision through them, either with the Scalpel or Lancet, big enough to admit a Pea. Which being inserted and covered with a Plaster and Compress, nothing more is wanting than your Roller to compleat the Operation. Thus by cleansing and dressing the Wound every Morning and Evening with a fresh Pea, it by Degrees, in a Day or two, degenerates into a little Ulcer, discharging daily a Quantity of purulent Matter; which should be carefully cleansed or wiped off at every Dressing.

III. There is a second Method of making Issues by wounding the Skin with a red-hot Iron, or actual Cautery; which is usually included in a Sort of Capsula, or Case of Iron, *Tab. XII. Fig. 8. A*, to conceal it from terrifying the Patient. When the Case *B B* is fixed upon the proper Part for the Issue, the Cautery, or red-hot Iron *C*, is then pressed down upon the Integuments, and the Eschar or Burn, is next to be dressed with fresh Butter, or *Ung. Basilic.* till it at length separates in repeating the Dressing every Day. Then the little Ulcer formed is to be filled with a Pea, and dressed as before. Though this Method of making Issues, according to the Antients, is more severe, yet it must be equally more efficacious than the other; as the Pain and Cauterization must necessarily make a considerable Revulsion. But there are very few Patients who will submit to it.

IV. The third and last Method of making Issues, is, by the Application of potential Cauteries, or corroding Medicines: In order to which, a Piece of Plaster is first perforated, as in *Tab. XI. Fig. 11.* and then applied, so as its Aperture may cover the Place marked with Ink for the Issue. A Piece of the Caustic, mentioned *Part I. Book IV. Chap. III. Sect. XI.* is then imposed upon the Aperture of the Plaster, and retained close down upon the Skin with some scraped Lint, a small Compress, and a large Plaster; and lastly, with a larger Compress and Bandage. The Operation thus far advanced, the Patient is now to be ordered to rest about six or eight Hours, more or less, according as the Caustic may be in Strength: Which Time being elapsed, and the Dressings removed, the Eschar is to be treated as we before directed at *Sect. III.*

V. But in whichever of these Methods you make the Issue, it must be dressed at least twice every Day, especially if it runs well, and in the Summer time; And at each Dressing you must put in a fresh Pea, and cover it with a clean Plaster, or Piece of waxed Paper or Silk, or an Ivy-Leaf, retained with Compress and Bandage. But the Deligation for Issues is much more commodiously performed with a leathern Swath, fastened by Clasps, as in *Tab. XII. Fig. 9.* than by a circular Linen Roller. It is remarkable, that some use Peas of Silver or Wood to dress their Issues with, instead of the common ones: But the Difference in their Effects is not material. In this Manner Issues are to be kept open, till the Patient is recovered of the Disorder for which they were made; and

and in some Cases they should be continued as long as the Patient lives: Or if the same Disorder, or some other, returns upon drying them up, they must be again opened immediately.

Use of
Issues.

VI. Issues are used chiefly for various Disorders in the Head, Eyes, Ears, the Teeth, or Sciatica, and other painful Disorders, which are this way frequently relieved or cured. The Use and Advantage of Issues is well known, and daily experienced by most Surgeons^a, contrary to the Opinion of HELMONT, and some others, who think they serve only to torment and trouble a Patient. However, I must frankly own, that a Cure is not to be expected from Issues; and though they generally give some small Relief, yet in many Cases I have found it too inconsiderable to be sensible: But if, upon Trial, they afford no great Benefit, it is best to dry them up again in a little Time. But we must not forget to take notice, that it is frequently necessary to make two or more Issues, to produce any considerable Effect in stubborn Disorders, as one in each Arm, or in one Arm and Leg of the same Side, &c.

Method of
drying up
Issues.

VII. In order to close up an Issue, when that shall be judged proper or necessary for various Reasons, little more is required than to discharge the Pea, and refrain from putting in any more, by which means alone it will close up in a short Time. But if any proud Flesh should protrude itself, it may be amputated, or else removed and taken down with *Alum. ust.* Lastly, it is observable, that when Issues of People far advanced in Years cease to make their wonted Discharge, and turn of a livid and blackish Hue, it is a Sign they are invaded by some desperate Disorder, and that even Life itself is very near its Period. In this Case proper topical Remedies should be speedily applied, as *Cantharides*, *Rad. Irid. Florent. vel Helleb. nigr.*

CHAP. XX.

Of BLISTERING with CANTHARIDES.

Blistering
described.

I. **B**Y Blistering is understood an Elevation of the Cuticle, from the Cutis into Vesicles, or Bladders replete with a serous Humour, by the Application of external Remedies, and chiefly Cantharides, to the Skin, which may be applied either in form of a Paste mixed up with Yeast; or else mixed with some Emplaster, and then spread on Linen or Leather, which is the modern Practice: And therefore we constantly meet with the *Emp. Vesicator.* ready prepared in the Shops of Apothecaries. These being applied and retained upon the Part with Bandage and Compress, in about eight, ten, or twelve Hours Time, will raise the Cuticle under the Plaster in a Blister, replete with a thin and acrimonious Lymph. The beforementioned Number of Hours being expired, the Blister-plaster is removed; and the Cuticle, if yet entire, is opened with a Pair of Scissors, its Contents being gently absorbed by Lint or soft Linen. This

^a Vid. GALVANI *Trattato delle Fontanelle.* GLANDORPII *Gazophylacium*, &c. *Æt. Hafniens.* Vol. iii. xii. MUYSII *Prax. Med. Obs.* 2. SCHELHAMMERUS, FRED. HOFFMANNUS, HILSCHERUS, &c. in *Dissertationibus.*

done, the Part blistered is dressed with some soft and cooling Plaster, which Dressing is repeated every Morning and Evening, till the Discharge ceases, and the Part heals. And though it is remarkable, that the Cuticle is separated from the true Skin by this Plaster, in the same Manner as it is in Burns; yet it meets with so sudden a Reproduction, as is not a little surprising. Some make their Dressings with Beet or Dock-leaves, spread with fresh Butter, instead of a Plaster.

II. The Size of Blister-plasters varies greatly with the Nature of the Patient's Disorder, and the Size or Figure of the Parts to which they are to be applied. Those for the Temples and behind the Ears, may be about the Size of a Crown Piece: As may also those for the Neck and Arms, Legs and Thighs, and the Top of the Head. But those for the Back and between the *Scapulae*, may advance to two Hands Breadth.

The Size of
Blister-plasters.

III. Vesicatories are frequently of very great Benefit, as well as Issues, in many of the most obstinate Disorders: Especially when vicious Humours are to be discharged from the Blood, or a strong Revulsion to be made from any Part. Thus Vesicatories are of excellent Service behind the Ears, upon the Head, Neck, Arms, &c. in all Inflammations of the Eyes, and Suffusions or incipient Cataracts: As they likewise are in all lethargic and paralytic Affections: In which Cases they give a Stimulus to the Blood and Spirits, and excite those Fluids from a languid to a brisk Motion. Strong Vesicatories are also frequently used in ardent Fevers attended with a Delirium: In which Disorders they are properly applied to the lower Extremities, in order to diminish the Influx of Blood sent to the Head and Brain. Lastly, Blisters are used with great Success in the Small Pox^a, when the Pustules seem to strike in; as also in the more obstinate arthritic and rheumatic Complaints, where they are best applied even to the Part in Pain, according to the Observation of SCULTETUS (*Obs.* 73.) Blisters are also of great Efficacy when applied to the Legs and Thighs in Asthmas; and a little below the Elbow for the Tooth-ach.

The Use of
Blister-plasters.

IV. When the Disease requires a considerable Discharge this Way, it may be convenient to mix a little Powder of Cantharides with the Ointment or Plaster, with which the Blister is to be constantly dressed: By which means greater Benefit may be obtained than one would imagine, in many of the most obstinate Diseases.

How to increase the
Force of
Blisters.

V. There is another Case, in which *Cantharides* are of great Service. When Issues, or Ulcers of the Legs, which are of long standing, stop, either spontaneously, or from some Disorder (especially if the Patient is advanced in Years;) in this Case sprinkle *Cantharides* on the Issue or Ulcer: Let a Piece of Blistering-plaster be made in the Form of a Pea, and be applied to the Part. The Humours that before ceased, will generally be provoked by the Stimulus of the *Cantharides*, and be discharged again to the great Benefit of the Patient. Add to this, that in some Wounds (particularly after the Operation of Lithotomy) where the Lips of the Wound become callous, the Application of *Cantharides* destroys the Callosity; and the Wound heals without Difficulty. See CHESL- DEN, and DOUGLASS, *Lib. de Lithot.* But this Application is sometimes attended with an *Ardor Urinae*, or great Heat and Pain in making Water; especially if the Blisters are several in Number, and stronger, or continued longer on the Parts than usual: In which Case the Patient suffers the same Symptoms as

Blisters often
accompanied
with *Ardor
Urinae*.

^a See FREIND's excellent *Treatise on Fevers and the Small Pox*.

if he had taken *Cantbarides* internally. But then these troublesome Symptoms are as quickly removed by a frequent and plentiful drinking warm Milk, and amygdalate Emulsions. Lastly, Blisters should not hastily, but with great Caution, be used for Patients who are hydropic or cachectic; because they frequently produce an incipient or confirmed Mortification. See BAGLIVI on Blisters, HOFFMAN, VATER, and others.

C H A P. XXI.

Of INJECTIONS.

Of Injections
in general.

I. **M**ANY Disorders are very difficultly, if at all, curable, unless the Parts affected are injected with some proper Liquor, by means of a Syringe and a proper Tube. Which Operation is by Surgeons called *Injection*, and consists chiefly in drawing the Liquor into the Syringe, and forcing it out again into the disordered Parts. The Method of performing which is too obvious for any body to be ignorant of. But this Observation may be necessary, To apply the Syringe and Tube to the Parts very carefully, especially in very sensible or nervous Parts, to avoid giving the Patient too much Pain: Also to be mindful, that the Liquor you inject be not too hot or cold. But what Kinds of Liquors and Methods are to be used for Abscesses and fistulous Ulcers, we have before observed (in the Book on *Ulcers*, Chap. II. N. III.)

In Disorders
of the
Mouth and
Fauces.

II. In Ulcerations and Inflammations of the Tonsils, Uvula, and Fauces, Injections are generally useful: But Care is to be taken to press down the Tongue with a Spatula (*Tab. I. litt. P*) or the flat End of a Spoon; and having introduced the Syringe two or three Fingers Breadth into the Mouth, the Injection is to be gently thrown in, several Times. A proper Syringe for this Purpose is described by DEKKERUS (*Exercit. Pract.* pag. 242.) furnished with a crooked Tube, whose Extremity is perforated with several small Holes, as in *Tab. VI. Fig. 11*. This Instrument is particularly useful, when the Patient's Mouth cannot be easily opened by a Spatula, which is often the Case.

In Gonorrhœas.

III. Injections are also frequently thrown into the Urethra of the Penis, in Men under a Gonorrhœa, in order to wash out the corrupt Matter, and mitigate the Heat, Acrimony, and Pain. The best Syringe for this Purpose is that in *Tab. IV. Fig. 10*. fitted with a convenient Tube to enter the Penis. Also the Syringe in *Tab. XII. Fig. 10*. may be very commodiously used in this Case; because the Liquor does not easily fly out of it behind. The most convenient Liquors for abating the Heat and Pain in this Disorder, are, warm Milk and Barley-water, sweetened with Sugar, Honey, or Syrup of Marshmallows: And after the Use of these, when we would heal up and strengthen, or gently astringe the Parts, we may use the following Mixture with Success:

R. *Aq. Plantag.* ℥iv. *Mell. Rosat.* ℥j. *Sacch. Saturni* ℥j. *M. f. Injunctio.*

In Disorders
of the Ute-
rus.

If a small Stone should happen to stick in the Urethra, its Exit may be very much promoted by injecting Oil of sweet Almonds or Olives by the Penis. For Disorders in the Uterus, to expel the After-burthen, when it adheres too strictly to the Womb, or to cure Ulcers that Part, or cleanse the *Fluor Albus*,

bus, it is convenient to inject some deterging and healing Liquor, by the Syringe which MAURICEAU has described for that Purpose. See *Tab. VI. Fig. 12* and *13*. But when this Syringe is used, the Surgeon should be careful that its foremost high Tube be cautiously introduced into the Vagina. To answer this End in a stubborn *Fluor Albus*, I have experienced the Syringe at *Tab. XII. Fig. 10.* to be very convenient.

IV. Lastly, for the Manner in which Liquors are to be injected into the *Thorax* or *Abdomen*, to cure Ulcers or Wounds in those Parts, that has been before described, when we treated of Wounds. As to the Liquors which are injected by the *Anus*, under the Title of Clysters, we shall consider them when we come to treat of the Operations proper to that Part.

In Disorders of the Thorax and Abdomen.

C H A P. XXII.

Of ACTUAL CAUTERIES.

I. CAUTERIES are by Physicians and Surgeons distinguished into two The several Sorts of Cauteries. Classes, actual and potential. By actual Cauteries they intend red-hot Instruments, usually of Iron, which are applied to many Parts and Disorders. By potential Cauteries we understand certain Kinds of corroding Medicines, of which we shall speak hereafter in *Chap. XXIV.* Of actual Cauteries, or hot Irons, it is necessary for the Surgeon to have a considerable Apparatus: Inasmuch as different Disorders require Cauteries of various Sizes and Figures. Notwithstanding there are a greater Number of cauterising Instruments described and figured by the Writers in Surgery^a, the chief of which we have given you in *Tab. III.* yet it may be necessary for the skilful Surgeon to invent others, suitable to the particular new Disorders which may sometimes occur to him.

II. Cauteries have various and manifold Uses. For they are not only used to The Use of Cauteries. destroy the dead Parts of carious Bones, in Cancers, to remove *Schirri*, Excrescencies, Carbuncles, and mortified Parts; but also to make Issues and Setons, to stop Hæmorrhages in Wounds and Amputations: And, Lastly, to remove an Amaurosis, Epilepsy, Sciatica^b, with Pains in the Teeth and other Parts. We are therefore so far from condemning the Use of Cauteries, as have SEPTATIUS, HELMONT, BONTEKOE, OVERKAMPIO, CRAHN, &c. that we rather recommend them as eminently serviceable in many of the beforementioned Disorders. They who are desirous of seeing more upon this Subject, may read ALBUCASIS ARABS and SEVERINUS concerning the wonderful Effects of cauterising, in his elegant Book *De Efficaci Medicina*, &c. He may likewise consult Jo. COST. Prof. Bonon. *de igneis Medicinæ Præsidiis*, Venet. 1595. To these add FIENUS and BARTHOLINUS *De Cauteriis*.

III. For the right Application of Cauteries, various Observations are necessary. The Application of Cauteries. In the first Place, the Surgeon should see that the Size and Figure of the Caution correspond to that of the disordered Part: And while the Patient is preparing for the Operation, to let the Caution be heating in the Fire. After

^a See ALBUCASIS, PARÆUS, ANDREAS A CRUCE, SCULTETUS, &c.

^b SCULTETUS *Obs.* 72. TULPIUS, *Lib. iii. Cap.* 36. DECKER, *Exercit.* pag. 34.

which, it will be necessary to secure the sound Parts from the Cautery, to prevent giving more than necessary Pain. For this Reason it is, that the fleshy Parts upon a carious Bone are first drawn and held aside by the Fingers of an Assistant, before the Cautery is applied. When the Instrument is sufficiently hot, it is to be applied and strongly compressed upon the disordered Part, till the Surgeon perceives the Bottom of the disordered Parts appear sound. To effect this the more speedily, it will be necessary to have several Cauteries in Readiness, that if one be insufficient, he may use a second or a third: Which Caution is more especially of Consequence to be observed in carious Bones and large Hæmorrhages.

The Use of
Cauteries in
Apoplexies.

IV. It may be here not amiss to take notice, that several Physicians have found by Experience, that Cauteries have succeeded in Apoplexies, when all other Remedies have failed. But for the Part to which the Cautery is to be applied, there are various Opinions. SCULTETUS, in *Obs.* 34. is for having it to be applied to the Occiput: But ZACUTUS LUSITANUS, and RIVERIUS, think it much better to cauterize between the first and second Vertebra of the Neck. Others again pitch upon the Meeting of the coronal and sagittal Suture: And Others prefer different Parts. MISTICHELLIUS, an *Italian* Writer upon the Apoplexy, asserts, that no Place can be so well pitched upon for Cauterizations in Apoplexies, as the Soles of the Feet. But the Manner in which the Soles of the Feet are to be cauterized in that Disorder, the forementioned Author has endeavoured to demonstrate in a particular Table, for which see *Tab. XII. Fig. II.* where the Parts to be cauterized are signified by the Letters A A, the Cautery by the Letter B. Though that Instrument may doubtless be of another Figure than a square one. I tried this Practice upon a Person in an Apoplexy: But, instead of recovering, he died.

C H A P. XXIII.

Of BURNING with MOXA.

TO Cauterizations it may not be improper to join burning with Flax and *Moxa*, which latter is a kind of downy Substance, separated from the Leaves of a Sort of *Indian* Mugwort, and is used by the *Indian* Nations: But the first we find was used by HIPPOCRATES^a, and the other ancient Physicians, to cauterize Parts in Pain^a. Some of the Moderns wonderfully extolled Cauterization with *Moxa*, as the most effectual Means to cure, and wholly extirpate the Gout. But for the Art of cauterizing with it, it may be necessary to observe the following Particulars: (*viz.*) In the first Place, to make a small Cone of the Lint or *Moxa*, about a Thumb's Breadth long, (See *Tab. XII. A B*, at the Letter A and B) made much after the same Manner as they usually are for a Suffitus. The Basis of this Cone is to be stuck upon the Part with Gum Arabic, or Gum Tragacanth, and its Point is then to be fired by a Candle, or a burning Coal. By this means not only the Cone will be gradually consumed, but the painful Part will be at last by Degrees cauterised, and thence the Pains of the

^a *Lib. de Affect. Cap. 30.*

^b *CELSUS, Lib. iv. Cap. 23.*

Gout will frequently have some Remission. But if the Pains do not entirely vanish at the first, a new Cone is to be applied again to the Part, and the Cauterization thus continued till the Pain ceases. But, however this Process may have been cried up by many of the *Europeans*, it is at present quite in Disuse, and that not without Reason: For, besides the acute Pain which it causes, it is frequently found to have little or no Effect. But the *Chinese* and *Japonesse* have the Operation at this Time in the highest Esteem; insomuch that it, with their Acupuncture, makes their chief Remedies.

These Cauterizations are said to be at present in use among the *Arabians*. More may be seen upon this Head in RHYNIUS *De Atribritide*, pag. 145. CLEYERUS in *Medicina Sinica*. PURMANNUS in *Chirurg. Pars III.* pag. 292. PECHLINUS in *Obs.* pag. 263. VALENTINI *Polychrest. Exotic.* pag. 197. and a particular Dissertation upon *Moxa*: And, lastly, KOEMPFER, in *Amœnit. Exotic.* pag. 589. and in his *Histor. Nat. Japon.*

CHAP. XXIV.

Of CAUSTIC and CORRODING MEDICINES.

I. CAUSTIC and Corroding Medicines, as they are called by our Surgeons, are those Medicines which being applied to Parts, consume, and, as it were, burn them like hot Irons: Whence the *Greeks* gave them the Names of *Caustics*; and CELSUS^a denominates them *Adurentia* and *Exedentia*. However they differ in this from actual Cauteries, that they perform their Effects slower and with less Force and Pain: Whereas in the Application actual Cauteries act instantaneously, and occasion most acute Pain. Potential Cauteries differ among themselves in various Degrees of Strength, according to their different Substance and Preparation: So that sometimes more, sometimes less, is applied to a Part for any Purpose. But among the various Kinds of potential Cauteries, the most considerable and effectual among us is the *Lapis Infernalis*, which is prepared *e Calc. Viv. & Cinerib. Clavellatis*, and which is applied for the opening Abscesses, as we have before mentioned (*in Part I. Book IV. Chap. III. N° XI.*) But there are some who prefer Lunar Caustic, or a Salt prepared from a Calcination of Soap-boilers Lees, or *Ol. Vitriol.* or a Solution of Mercury in *Aq. Fort.* Butter of Antimony, and a Mixture of Soap and Quick-lime; or, lastly, an arsenical or mercurial Sublimate, mixed with a little Honey. But it seems much safer to abstain from the arsenical and mercurial Sublimate, lest we should occasion those grievous Disorders and violent Pains, nay, even Convulsions and Death, which they sometimes produce^b. In what Manner potential Cauteries are to be applied for opening Abscesses, and making Issues, we have before declared in *Part I. Book IV. Chap. III. N° X.* also *Part II. Sect. I. Chap. XIX. N° IV.* for these Cauteries are said to be strong enough to remove Warts, Tubercles, Excrescences, Sarcomas, encysted Tumors, Wens, and schirrous Tumors, if they are properly applied either superficially, or to the Root of the disordered Parts. By these an Hydrocele may be conveniently opened, and

^a Lib. V. Cap. 7 & 8.

^b This HILDANUS mentions, *Cent. VI. Obs. 22, & 80.*

even a whole cancerous Breast may be removed. A considerable Instance of the Success of this Practice in *Germany*, we have from the celebrated SUTORIUS of *Norimberg*, afterwards Surgeon to the Duke of *Brunswick*. But great Caution is necessary in this Kind of Practice, not to irritate such Parts and Disorders by these Medicines, which, if they should prove inflexible, might endanger the Patient's Life. For thus a Schirrus may often be turned into a Cancer: And if they are applied to the Eyes or Eye-lids, they may hurt Vision, and may sometimes occasion profuse Hæmorrhages, if applied near large Veins and Arteries. Or, lastly, they may occasion Convulsions by injuring the Nerves: Though perhaps these are not all the bad Consequences that may attend an injudicious Use of potential Cauterics. But for the skilful Application of them, we shall give some Directions hereafter.

C H A P. XXV.

Of Opening ABSCESSSES.

THE Methods to be used for opening Abscesses, I think, have been already described in *Part I. Book IV. Chap. VIII. N° VIII.* Therefore to avoid Tautology, we shall refer our Reader thither.

C H A P. XXVI.

Of WARTS.

The various
Kinds of
Warts.

WARTS are commonly known to be small Excrescences of the Skin, seated in most Parts of the Body, but chiefly in the Hands and Face. Their Size and Figure are very various: Some are very broad and flat; some again are very slender, and others appear in Form of a Pear hanging by its Stalk. These are commonly removed more for the Deformity they occasion, especially in the Face, Neck, and Breasts of beautiful Women, than for any Pain or Danger. And, notwithstanding the great Variety of superstitious and insignificant Remedies which are sometimes used by the Populace, and even some Physicians, for the Removal of Warts, none of them are so expeditious and certain as the Means which come from the Surgeon.

Cure by Li-
gature.

II. To come therefore to the Purpose, we shall briefly deliver the chief Artifices used by Surgeons for the Removal of these Excrescences. And the first that offers is that by Ligature: Which consists chiefly in this, violently to bind a Horse-hair, or a Piece of fine Thread or Silk about the slender and depending Root of the Excrescence. By this Means the nutritious Vessels being compressed, and the usual Supply of Fluids being cut off, it gradually withers and decays.

Cure by Ex-
tirpation.

III. A second Method of removing these Excrescences is, by some sharp Instrument, to wit, by taking them up by a Pair of Pliers, and cutting them cautiously off with a Pair of Scissors. The Wound is to be dressed for some Time

Time with *Lap. infernalis*, or some other caustic Medicine, that if there be any of its Root remaining, out of which a fresh Tubercle might arise, it may be corroded and destroyed.

IV. But if the Excrecence is of the larger Kind, it is more adviseable to have Recourse to caustic Applications. But to make these act the more expeditiously, it may be proper to cut off the external and hardest Part of the Tubercle, either with a Scalpel, Razor, or Pair of sharp Scissors, and then to dress the Wound with Oil or Tartar *per deliquium*, or Spirit of Salt. But if these seem not strong enough for the Purpose, more vehement ones may be used; such as Spirit and Oil of Vitriol, *Aq. Fortis*, and Butter of Antimony. On the contrary, the softer and smaller Kind of Warts may be removed barely by wetting with the Juice of Celandine, or the Milk of Spurge. In the mean time, Care should be taken to prevent any of these Applications from getting into the Eyes, when they are used about the Eye-lids, which might blind the Patient. To prevent these Effects, it may be proper to circumscribe the Wart with a Ring of Wax, or a perforated Piece of Plaster, so that the Wart may come through; by which means the Wart only will be corroded, and the other Parts remain entire. By the same Methods other Tubercles and Spots, which deform a Person, may be removed.

V. A fourth Method of removing Warts, is by some actual Caustery, accommodated to the Size of the Excrecence, so that it may penetrate to its Root, when applied. (See *Plate III. Fig. 13, 14.*) Though there are many violent Means to extirpate Warts, none can equal that of the actual Caustery; which occasions most acute, though usually but a momentaneous Pain. The Part cauterized may be often dressed with *Basilicon*, or some other digestive Ointment and cooling Plaster, such as *de Sperm. Ranar.* This is the most certain Method of removing these Excrecences in whatever Part of the Body, the Eyes only excepted; for they never return.

VI. The fifth and last Method is that used by Mountebanks upon the Stage, which consists chiefly in anointing the Tubercle with some mollifying Ointment; after which they very violently pull it out by the Nails of their Fore-finger and Thumb. But as this Method of Cure is not very agreeable, so it is often found to be also ineffectual; for they generally return again from the Remainder of the Root.

VII. Lastly, we are here not to omit taking notice of some Warts which are livid and blue; which are usually seated in the Face, Lips, and about the Eyes, and are of a cancerous Disposition, much better left to themselves: For when they are irritated, they frequently degenerate into a Cancer, and miserably torment the Face, Eyes, and other Parts in which they are seated. You will find a remarkable Instance of this Kind of Warts in *SAVIARD's Observations, Obs. LXVIII. p. 296.* which, through an ill-judged Attempt of curing it, was attended with the most deplorable Symptoms, and destroyed the Patient.

CHAP. XXVII.

The Method of removing EXCRESCENCES, fleshy TUMORS, and MARKS from the MOTHER.

What an
Excrecence
is.

I. **E**VERY preternatural Tumor, which arises upon the Skin, and grows in the Form of a Wart or Tubercle, is called an Excrecence. They are by the *Greeks* called *Acrothymia*^a; and if they are born with a Person, as they frequently are, they are commonly called *Nævi Materni*, or Marks from the Mother. But if the Tumor is large, so as to depend from the Skin like a fleshy Mass, it is then usually called a *Sarcoma*. These Tumors arise in all Parts of the Body; more particularly in the Head, Face, Eyebrows, Neck, Breast, Abdomen, Anus, Legs, and Arms. But the worst of these Tumors are those, which arise in the private Parts. The Size and Figure of them are various, sometimes arising to a very considerable Bulk, which are described and figured variously by the Writers of Observations^b. With regard to their Colour, some resemble that of the Skin, others are inclined to black or red. And, lastly, with regard to their Figure, some are like Strawberries, Mulberries, Grapes, Figs, Pears, Mice, and various other Figures.

Their Re-
moval,

II. With regard to the Treatment of these, it is to be observed, that almost the same Artifices may here take Place as for the Removal of Warts, either by Ligature, the Knife, or actual and potential Cauteries, according as their different Sizes, Situations, Figures, the Patient's Habit of Body, his Will, and other Circumstances may require. For the rest, when any of these Excrecences have a very large Root, which the *Greeks* call *Mermyxia*^c, or if there are large Arteries or Veins near its Root, or if it be firmly joined to any Bone, or have a Tendency to turn cancerous^d, the Surgeon should then remove them with Caution: Or, when there is great Danger, he ought wholly to neglect them, to prevent exposing his Patient to greater Dangers. When these Tumors are seated near large Veins and Arteries it is often proper to have Styptics, Bandages, and often actual Cauteries in Readiness to stop the Hæmorrhage, especially if they are removed by Abscission.

^a See CELSUS, *Book V. Ch. 28. N. 14.*

^b See SCULTETUS, *Arm. Chirurg. Plate XXV.* ELSHOLST, *History of the Cure of a Steatoma.* PECHLIN. *Obs. Med. Book III. 46.* BARTHOLIN. *Hist. Anat. Cent. 1, 23.* PURMAN. *Chirurg. Curios. p. 50, 134, and 370.* LAMESWERDE, in his Notes on SCULTETUS, has described many of a very remarkable Figure. The *English Philosoph. Transactions* give an Account of a very extraordinary Tumor of this Kind, that was taken off from the Cheek, weighing nineteen Pounds, N. 354. And the famous CULME has given a Description of a large *Stemmatous Exostosis* in the Clavicle, with his Treatment of it; published at Dantzick, 1732.

^c CELSUS, *Book V.*

^d WEDELIUS saw a Case, where a *Nævus* turned cancerous on the Application of *Aquafortis.* *De Morb. Infant. p. 10.*

CHAP. XXVIII.

Of ENCYSTED TUMORS, and especially SCIRRH, ATHEROMATA, STEATOMATA, MELICERES, and others.

I. **W**HEN Tumors that arise from different Parts of the Body are contained in certain membranous Coats, they are commonly called *Encysted Tumors*, being sometimes harder or sometimes softer, of a palish Colour, and usually attended with little or no Pain. These Kinds of Tumors arise almost in all Parts of the Body, from Obstructions, either in the Glands, or adipose Membrane; more especially in the Head, Face, and Neck, where they frequently occasion great Deformity: (See *Plate XII. Fig. 13.*) The membranous Coat with which they are invested, is often of a considerable Thickness, and is usually the Coat of the disordered Gland, or some of the adipose Cells. At their Beginning they are usually very small and moveable, being a considerable Time increasing by Degrees, till at last they sometimes arrive to an enormous and surprising Bulk. The Consistence of some of these Tumors is soft and fluctuating, of others more hard and consistent. The Figure of them is various, some being like Filberds, Acorns, Bullets, Walnuts, and Eggs; others again like Pears suspended by a Sort of Stalk, like some of the fleshy Excrecences; some have a very large Root, and resemble ones Fist, Head, or other Figure. The Bulk of some of these Tumors has sometimes increased to that Degree as to weigh many Pounds^a: Others of these Tumors so firmly adhere to the adjacent Parts as to be wholly immoveable, and become of so hard a Consistence as to resemble a bony *Callus*; though many of them always remain soft and moveable. Several Kinds of these encysted Tumors are variously distinguished by their different Consistencies. When their Contents resemble Paste, they are then called *Atheromata*; if they are of the Consistence of Honey, they are termed *Melicerres*; but if they are of a fattish Consistency, like Suet or Lard^b, they then take the Name of *Steatomata*: If they happen in a Gland which becomes indurated, the Tumor is then called *Scirrhus*; and, lastly, when they are of a fleshy Consistence, they are termed *Sarcomata*. Some of these Tumors, as^c CELSUS has observed, have been found full of Hair. Again, these Tumors are variously distinguished and denominated from their different Situations: For when they are seated under the Scalp, they are called by the Name of *Talpa*, *Testudo*, or *Lupia*; when they are seated in the Neck, *Strumæ*, or *Scrophulæ*; but when they are situated in the Hands or Feet, especially near the Tendons of their Muscles, they are usually denominated *Ganglia*.

Various
Kinds of en-
cysted Tu-
mors.

II. These Encysted Tumors are usually discoverable without much Difficulty by the Eye and Hand: But they are very difficultly discernable from other Tumors barely by their external Signs, if we do not discover their Difference by

Diagnosis of
encysted Tu-
mors.

^a PETIT mentions one, that he extirpated, between the *Scapula*, of forty-eight Pounds Weight.

^b I have had some under my Care, that resembled curdled Milk, or new Cheese; for which there is no particular Name. For steatomatous Swellings in the Head consult ROONHUYNS, *Obs.* 17 and 20. A Cystic Tumor, that had many membranous Coats, is mentioned by MEEKEN, *Obs.*

Append.

^c *Lib. VII. Cap. 6.*

feeling whether they are harder, softer, or more or less consistent. For as the external Skin receives little or no Alteration in its Colour in the several Sorts of these Tumors, we can therefore form little or no Judgment by it. Nor is it of any great Consequence to be acquainted with the Nature of the included Matter, except the Hardness, before we proceed to the Cure of these Tumors: For, whatever Matter they contain, the Manner of Treatment is pretty much the same. It is however to be observed, that *Scirrhi* or *Sarcomata* are the hardest of any of these Tumors; next to these come *Steatomata*; all the rest are still softer, and may require some Variation in their Treatment, according to their Degree of Consistence. Those Tumors seated in the Neck, which are called *Strumous* and *Scrophulous*, are commonly thought to be the Glands in the Neck indurated: But I have frequently observed *Steatomata* and other encysted Tumors in the adipose Parts of the Neck. For it seems scarce possible that those very small Glands which are situated in the Neck, should grow to such a stupendous Bulk as sometimes to hang over the Abdomen: Whereas those in the adipose Parts may easily do so. But besides these, there are also frequently lesser Tumors in the Neck, which seem to be those Glands indurated and much enlarged, being in Fact a Kind of *Scirrhi*.

Prognosis of
encysted
Tumors.

III. When encysted Tumors are without Pain, are neither too hard, nor too much enlarged, they presage no great Danger, insomuch that it is common for poor People, and those who are afraid of the Surgeon's Hand, to bear them, to the End of their Lives, without any great Inconveniency. But when they grow too large, so as sometimes to weigh ten or twenty Pounds; when they cause violent Pains, as scirrhus Tumors frequently do; then, besides the intolerable Trouble they give the Patient, they also add great Deformity: And, if they are not timely removed, they often occasion a Consumption, or Cancer, putting the Patient in imminent Danger of his Life, as we before observed in the Chapter of *Scirrhus Tumors*. Every one must know, that, in the Treatment of these Tumors, for a Cure, the Assistance of the Knife is constantly to be called in: Because they will not easily digest, or be brought to Suppuration, as we have already observed in scirrhus Tumors. In the mean time, those Tumors are more safely and easily removed by the Knife, which are of no long standing, are soft, small, and moveable: Whereas those which are very large and hard, are attended with great Danger: especially if they are seated near to large Veins and Arteries, by Nerves, Tendons, or upon the Joints; or, if they happen in feeble and old People. Hence the Surgeon may judge from the Nature of the Tumor, and Circumstances of the Patient, whether or no, and by what Means, it is curable.

Cure by dis-
cussing.

IV. With regard to the Cure of these Tumors, various Methods are prosecuted. I am not insensible, that many Surgeons are for an immediate Extirpation of all encysted Tumors, without any more Delay: But I am rather inclined, with HIPPOCRATES, first, to try them with more gentle Methods of Cure. Whenever I meet with these Tumors, as yet soft, and of no long standing, I think it every Way more proper to disperse, or else to suppurate them, before the Knife is called in for Assistance. But on the contrary, when these Tumors appear to be very hard, and of long standing, it seems most proper to refrain from topical Remedies. For those Means are so far from succeeding in the Digestion or Discussion of scirrhus and steatomatous Tumors, that they

very

very often increase them, and sometimes turn them into a Cancer: Whereas they might have been tolerable in themselves for many Years, so that under these Circumstances we must rely altogether on Extirpation. But if the Patient is afraid of the Knife, and will admit no Means but topical Remedies, it may not be amiss to use some of the discutient or digestive Plasters; of which Sort are *de Ammoniaco, de Galbano, de Ranis cum Mercurio. Diachylon cum Mercurio, de Mellilot. Oxycroc. diaphoreticum MYNSICHTI, Diasapon, &c.* SCULTETUS (in *Obs.* 87.) assures us, he has cured various encysted Tumors of the *Melicer* kind with *Ceratum diasinapios*: But before a Plaster of that is applied, it is generally adviseable to anoint the Part first with *Bals. Peruv. Ol. Sapon. vel Petroleum, &c.* by which Means the Tumor frequently diminishes by Degrees, till it be at length dispersed. To do this the more effectually, a little mercurial Ointment should be well rubbed into the Tumor every Day before a Fire. See more concerning the Dispersion of schirrous Tumors in *Part I. Book IV. Chap. XVI.*

V. If the Tumor does not diminish by the Use of discutient Applications, Cure by Suppuration. you must endeavour to bring it to Suppuration^a: And this more especially when it is of the softer Kind, like the *Melicer* or *Atheroma*. For this Purpose the Application of a Plaster of *Diachylon* with the Gums, and the Repetition of warm emollient Cataplasms to the Tumor, are extremely useful: And the more so, if you moisten the middle of the Tumor every Day with a little strong *Sp. Salis Ammoniaci*. When the included Matter has thus acquired a due Softness, and the Integuments appear a good deal extenuated, you ought then to open the Tumor by a large Incision; and, having discharged the Matter with as much as you can of its including Cyst, the Remainder is to be brought away, by dressing with digestive or detergent Medicines. For if the Tunics of the Cyst be not entirely discharged, the Tumor generally returns again soon after the Wound has been healed. In the Time you are deterging the Abscess, it may be proper to apply a *Diachylon* Plaster externally, to keep the Lips moist, and better disposed to unite afterwards.

VI. But if the Tumor can be neither dispersed, nor suppurated, but continues to enlarge itself, 'tis generally in that Case most adviseable to make an Cure by Extirpation. Extirpation of it, before it grows too large, or degenerates into a cancerous Nature. There are several Methods in Practice for removing or extirpating these Tumors, according to their Size and Nature. Those which are small and hard, or hang by a Root as by a Stalk, are generally best removed by Ligature, in the Manner of Warts: By which Means they wither, and fall off of themselves in a few Days. But the most ready and expeditious Method is, to cut them off with a Scalpel, and then to heal up the Wound: But if, in removing them this Way, you divide a considerable Artery, you may stop it by some potential, or even the actual Cautery, or else by taking it up with a Needle and Thread. Lastly, these Tumors may be often removed by the Application of caustic or corroding Medicines retained about the Root by means of Plasters, Compresses, and Bandage: And when you find the Root of the Tumor almost corroded through, the rest may be divided by the Scalpel.

VII. If the Root of the encysted Tumor appears too large for it to be conveniently taken off by Ligature, you must then remove it either by the Knife Removal of the larger Kinds.

^a See SCULTETUS on Suppuration in sciatomatous Cases, *Obs. Chirurg.* 93.

or Caustics ; though the latter is usually preferred by most Surgeons. In order to extirpate it by the Knife, you must first make a longitudinal Incision upon the Tumor : And if that does not appear sufficient, make another Incision across the former, till you think the Wound large enough for taking out the Tumor. In order to this you next dilate the Integuments, and separate them from the Cyst of the Tumor, by the Assistance of your Fingers and the Scalpel, by which Means you are to take it out whole, if possible. That you may succeed the better in the Operation, it will be proper for an Assistant to dilate the Lips of the Wound, either with Hooks or his Fingers, and to wipe up the Blood as it flows, with a Sponge, that the Surgeon may not be impeded in his Work. When the Tunic, or Cyst of the Tumor appears, which is usually pretty white and hard, the Surgeon is then to take hold of, and elevate the Tumor with the Fingers of his Left Hand, if it be small enough : But if it be too large to be thus held and elevated, it may be done by another Assistant with the Hook, *Tab. VIII.* or the Forceps, *Tab. XXIII. Fig. 1.* or else he may pass a crooked Needle and strong Thread cross-wise under the Tumor, and by that Means elevate it, while he circumspectly frees it from the adjacent Parts ; which is generally done with most Ease in the moveable Kind of these Tumors : But in the more fixed, the Task is pretty difficult. But in thus freeing the Tumor, the Surgeon must be cautious not to injure any important Part that may be contiguous : And if the Tumor, to be extirpated, is either in the upper or lower Extremities, where perhaps a large Artery or Vein is to be divided, in that Case the Tourniquet may, and even ought to be first fixed upon the Limb. Which Circumstances being duly observed, Tumors of this Nature have been often successfully extirpated, of many Pounds Weight, and which have been not only lodged in the fleshy Parts, but have even adhered to the Bones and Jaws^a.

Treatment
after Ex-
traction.

VIII. The Tumor being thus carefully extracted, if the Wound and Hæmorrhage be small, you may press the Lips together with your Fingers ; and by covering the same with Lint and Compresses, retained with a proper Bandage, the Patient is generally cured in a few Days time. But in Case of a profuse Hæmorrhage, the Blood is to be stopped, either by Ligature, Astringents, or the actual or potential Cautery, as we have directed more at large in *Part I. Book I. Chap. II.*

Removal of
Fragments
of the Cyst.

IX. But if by Neglect or Accident the including Cyst of the Tumor should be broke or wounded in its Extraction, (or industriously, to save the Eye, where it falls on the Eyebrow ; or to secure the Veins and Arteries in other Parts of the Body) Care must be afterwards taken entirely to remove it ; otherwise the Tumor will speedily return. Indeed if the Tumor be either a *Schirrrhus*, *Sarcoma*, *Steatoma*, or a glandular Part, the Contents are hard enough to make a clean Extirpation of it, notwithstanding its including Coats be wounded. But when the Matter of the Tumor is soft or fluid, by its escaping, the Tumor will become flaccid, so that it will be hardly possible to make a clean Extirpation of the Cyst without leaving some Fragments behind ; which must, in that Case, be brought away, by dressing the Abscess with Digestives, and deterging with *Præcipitat. rub. Alumen ust. Ung. Ægyptiac. &c.* mixed with your digestive

^a See ROONHUYSEN, *Obs. I. pag. 4.* SCULTETUS *cum notis* TILINGII. PECHLIN, *Obs. pag. 542.* PETIT *apud* GARENGEOT. *Chirurg. Tom. II. Cap. de Tumor. Tunicat.* LE DRAN, &c.

Ointments: By which means, having cleared the Sinus, you may incarn and heal, as in other Wounds, without the Danger of a Relapse.

X. If you rather chuse to remove Tumors of this Kind by the Use of Caustics, Use of Caustics in these Tumors. you must, in that Case, apply a Piece of *Lapis infernalis*, *Butyr. Antimon.* &c. upon it, defending the other Parts by a perforated Plaster, as we directed Chap. XIX. Sect. IV. But, in my Opinion, this is not a safe Practice in those encysted Tumors, which are hard, large, inveterate, and painful, or inclining to be cancerous; for thus you may easily turn a *Scirrhus* into a real Cancer: And even in others, 'tis hardly possible thus to erode them quite away without inducing violent Pains, Fever, Hæmorrhage, and other malignant Symptoms, to the Hazard of the Patient's Life. It is therefore, in the general, much better to have Recourse to the Knife for the Removal of these Tumors, when they are large and hard, notwithstanding we now and then meet with an Instance of their being successfully extirpated by Caustics^a. But if the Tumor appear soft, and yielding, like the *Atheroma* or *Meliceris*, in that Case, I frequently apply a Caustic, so as to make a Way through the Integuments, and Cyst: Or else dividing them by an Incision in the Middle, I discharge their Contents, and then deterge and incarn, as in other Abscesses; which last Method I take to be milder than an Incision, and Extirpation of the Cyst by the Scalpel. See LE DRAN on the Treatment of a *Meliceris* above the Knee.

C H A P. XXIX.

The Method of extracting foreign BODIES from WOUNDS.

I: **W**E meet with very little in the antient Systems of Physic and Surgery concerning the Extraction of Bullets, which may possibly be, in some Measure, owing to their not being so much in Use, or at least not so fatal formerly as now. We indeed read in CELSUS^b, that leaden Balls were used by Soldiers in War before the Birth of CHRIST: But then I suppose they were only flung by Slings or Bows, the destructive Powder being at that Time unknown. For the same Reason we also meet with no Directions for extracting Fragments of Bomb or Granade Shells, which are of a later Invention: But then they are more large in the Methods of removing the Ends of Darts, Spikes, Arrows, Swords, and such like Weapons. And though, at this Time of Day, Arrows are hardly ever used but among barbarous Nations, yet it may not be here improper to give brief Directions for their Extraction, if they should chance to come under the Surgeon's Care. In doing this, we shall find that almost the whole Business consists in drawing out the Head, so as that its protuberant Beard or Hooks may not wound and lacerate the contiguous Parts. If it appears to be lodged but superficially under the Integuments, it will be best to draw it out the same Way it entered, provided you first dilate the Wound sufficiently by Incision, rather than give Occasion for any of the adjacent Parts to be lacerated: Otherwise it may be thrust forwards, and drawn out in the Di-

^a Of extirpating scirrhus Tumors in the salival Glands, and those of the Neck and Breast, we shall treat hereafter in particular Chapters.

^b Lib. VII. Cap. 5.

rection of its Point in the opposite Side, having first made an Incision to meet it. This last Method is most eligible, when the Weapon has descended very deep, so that there is much less Space for it to pass onward, than to be drawn back again; and also when it has passed beyond any large Blood-vessels, or Nerves, so that it would induce a Laceration of them, to draw it back: And therefore, to avoid them, it must be thrust forward through an Incision made in the nearest and most convenient Part of the opposite Side. The Method of extracting the Ends of Spikes, Swords, Sticks, or the Fragments of Glass, Paper, Clothes, &c. you may find in *Part I. Book I. Chap. I. Sect. XXXIII.* and, in the third Chapter following, you will find the Method of extracting Bullets and Grains of Gun-powder, in Gunshot-wounds. Lastly, if any of these foreign Bodies have ruptured a large Blood-vessel in the upper or lower Extremities, so as to excite a profuse and dangerous Hæmorrhage, it will, in that Case, be immediately necessary to apply the Tourniquet upon a convenient Part of the Limb, before you search for the Body; which being extracted, the next Step is to secure the ruptured Vessel, and dress the Wound.

C H A P. XXX.

Of SUTURES of WOUNDS.

The Kinds
and Uses of
Sutures.

I. **T**HERE are two Kinds of Sutures used by Surgeons in Wounds: The first is made with a Needle, and distinguished by the Name of the *true* and *bloody Suture*; the other is made by the Application of sticking Plasters, and is termed the *dry* or *false Suture*. Sutures are not to be used indifferently in all Wounds: But in those chiefly, in which the Lips cannot be closely approximated by Deligation: As in many of the transverse, oblique, or angular Wounds, which have been lately inflicted, are quite free from any foreign Bodies, and are not attended with any Loss of Substance. In most of these a Suture will be of great Service, not only by expediting the Healing, or Union of the Wound, but also by procuring a smaller and neater Cicatrix. The dry Suture is used chiefly in such Wounds as are superficial, of no great Depth or Length, and particularly for those inflicted on the Face. Though even in these there are some Surgeons, who prefer and make the true Suture. But I think the different Circumstances and Dispositions of Wounds may very well direct the Surgeon, sometimes to one, and sometimes to the other Kind of Suture: For what need is there of stitching up a Wound, whose Lips may be well approximated, and retained together by Plaster and Bandage? I think the Needle ought, in such Cases, to be spared, both for the Ease of yourself, and the Patient. But on the contrary, in large and deep Wounds, where the Lips cannot be closely retained by Plaster and Bandage, or in those where the Part is almost amputated, or hangs by a little bit, as in the Nose, Ears, Cheeks, Chin, Forehead; Fingers, &c. there you ought immediately to conjoin the Lips by Suture with Needle and Thread.

Directions
for Sutures.

II. As we have already sufficiently explained the Method of making Sutures in Wounds (in *Part I. Book I. Chap. I. Sect. XXXIX. & seq.*) we shall here only add a few necessary Cautions: As, 1. That you ought always to shave the Hair of

of the Part clean off, with a Razor, before you attempt to conjoin the Lips of the Wound by dry Suture, with sticking Plasters. 2. That when one Plaster does not well retain the Lips, you must apply several, either by the Side of, or across each other, as in *Tab. IV. Fig. 4, 5, 6.* You are also to observe, 3. That the true Suture with Needle and Thread is of two Kinds, Simple and Compound: The first of which comprehends the *knotted*, the *Glovers*, and *circumvoluted*, and the Suture of the Tendons. And, among these, the first is so called from its distinct Knots, *Tab. IV. Fig. 16.* the Glovers from its Resemblance to the Suture used by these Artists, and by the Surgeon for Wounds of the Intestines, *Tab. IV. Fig. 20.* The circumvoluted Suture is, when the Thread is wound about the Needle, after it has been entered through both Lips of the Wound, as in *Tab. IV. Fig. 21, 22.* for the Hare-Lip: In treating of which we shall describe it more particularly. The Suture of a Tendon is also of a particular Kind, as we shall describe in our Chapter of uniting divided Tendons, by this Means, in the End of our Operations. Besides these now mentioned, there were various other Sutures used by the antient Surgeons, as the *Sutura Sartoria*, *Sutura Celsiana*, & *Clavata*, the last being made upon Quills or cylindrical Sticks, as in *Tab. IV. Fig. 19.* But we shall not insist upon a particular Description of these, which have been long out of Use: Only we may observe, that the *Sutura clavata* has been lately revived, and recommended with a little Variation, by PALFYN and GARENGEOT; who, instead of Sticks or Quills, use a bit of Silk spread with Cerate, and rolled up into a Cylinder. 4. Lastly, you must observe, that, in the Suture of deep Wounds, it is frequently necessary to introduce a Tent, and leave it at the Bottom of the Wound, till its Fundus appears well deterged, that you may heal it from the Bottom upwards.

C H A P. XXXI.

Of separating ADHESIONS betwixt the FINGERS and TOES.

I. **W**E frequently meet with new-born Infants, having several of their Adhesions of the Fingers together. Fingers or Toes cohering, or grown together, either by a strict Adhesion of their Flesh, or else only by loose Productions of the Skin, as in the Feet of Ducks and Geese. Though the same Disorder is also sometimes found in Adults, when their Fingers or Toes have been neglected, after an Excoriation of them in Burns or Wounds: To be freed from which Malady, the Patient is desirous of invoking the Surgeon's Aid, partly to be rid of the Deformity, but chiefly to recover the proper Use of the Fingers. These Adhesions may be separated in a two-fold Manner, according to the Nature of the Disorder, *i. e.* either by cutting out the intermediate Skin with a Scalpel, or Pair of Scissors, or else barely by dividing them from each other with those Instruments when they closely adhere. But to prevent their Cohesion again for the future, you must invest each of the Fingers separately with a spiral Bandage about an Inch broad, and dipt in *Aq. Calcis cum Sp. Vini*, according to the Figure in our last, or, XXXIXth Plate, on Bandages.

II. Some-

Or with the
Palm of the
Hand.

II. Sometimes the Fingers, instead of adhering to each other, grow to the Palm of the Hand, as I have more than once observed from Wounds or Burns; so that they cannot by any means be extended, or drawn back to open the Hand. For the Sake of Beginners, I shall recite the Method, by which I cured three of these Patients. First, I carefully separated the Fingers from their Adhesions with the Palm, without injuring their Tendons, and, after dressing them with vulnerary Balsam, and scraped Lint, I extended them on a Ferula of thick Pastebord, in which extended Posture I treated the wounded Fingers separately, till they were healed. But at every Dressing you ought to move the Fingers gently, to prevent a Rigidity, or Stiffness of their Joints.

CHAP. XXXII.

Of amputating DISEASED and SUPERFLUOUS FINGERS.

INFANTS are sometimes born with supernumerary, mis-shapen, and misplaced Fingers, of various Kinds, some with Nails and Bones, and others without, resembling fleshy Excrescences. When the Deformity or Incumbrance of these make their Amputation necessary, it may be conveniently enough performed, either by the Scalpel, or a Pair of Scissors; especially when there are no Bones in them: For if there are Bones, you must amputate with a stronger Pair of Scissors for the Purpose, able to cut through the Bones. If there are several of these Fingers, and the Infant appears too weak or infirm, to have them all amputated at one Time, it is best to take them off at separate and convenient Intervals, intermitting a few Days, so as to amputate the next, when the preceding is near well. The Hæmorrhage may be stopped with dry Lint and Compresses, or such as have been dipt in *Sp. Vini*, and the Wound next healed with some vulnerary Balsam, as in others. In the Year 1718, I cured an Infant of three Weeks old, after taking off a superfluous long Finger, which grew to the Thumb, which had a long Bone, and a Sort of Spur like that of a Cock, instead of a Nail; see *Tab. XII. Fig. 15*. I proceeded, first, by making an Incision through the Skin all round it with a Scalpel, and then cut through the Bone with a strong Pair of Scissors. This done, I stopt the Hæmorrhage, which was inconsiderable, with Lint dipt in *Sp. Vini*, and a close Bandage; and the Wound was afterwards speedily healed with vulnerary Balsam. I could recite many more Cures of the same Kind made by myself: But as the Method used was the same in all, they are not here necessary to be mentioned, since this alone will suffice.

C H A P. XXXIII.

Of amputating sphacelated FINGERS and TOES.

I. FINGERS and Toes are usually amputated by the Surgeon, chiefly When it is necessary to amputate Fingers and Toes. upon three Accounts; 1. When they are so contused and shattered by Bullets or other Instruments, that they cannot be restored and preserved: 2. When they are sphacelated, or totally mortified, either from Cold, Contusions, or other Causes: And, lastly, 3. When they become carious, cancerous, or scirrhus, so as to be curable by no Remedies or Applications whatever, as I have met with frequent Instances. Nor is it uncommon for the Fingers of Masons, Carpenters, and other Labourers, to be accidentally crushed, so as to make an Amputation of them unavoidable. See ROONHUYSE, *Obs. Chirurg.* 25.

II. Before the Surgeon proceeds to amputate Fingers or Toes, he ought to be first well assured, that there is no Possibility of preserving them sound and entire. Therefore if they appear to be but slightly crushed, or only beginning to be infested with a Gangrene, he ought to treat them with discutient and spirituous Applications, to prevent the Disorder from spreading itself; at the same time reducing and retaining the bony Fragment by his Fingers, and Deligation, as in other Fractures. But if they are so violently crushed as to hang but by a little bit, I know no great Reason why they should not be immediately taken off, either by the Scissors or Scalpel; as they also should when any one Joint is completely sphacelated; for Delays are, in those Cases, frequently very dangerous. But if any of the Fingers or Toes should be cut off by any sharp Instrument, so as to hang by a bit, the Wound being recent, though large, you ought not to take off the pendulous Part, but replace it immediately, securing it well by Plaster and Deligation, and this even when the Part is cut quite off, but obliquely. For I knew an Instance of a Butcher's Finger that was cut quite off obliquely, but being immediately fixed, and retained in its proper Place by Deligation with a Linen-rag, it adhered, and became well without any other Medicines. At least, it is always best to try, if it will not adhere before you cut it off, and reject it; see *Chap. LXXII.* following.

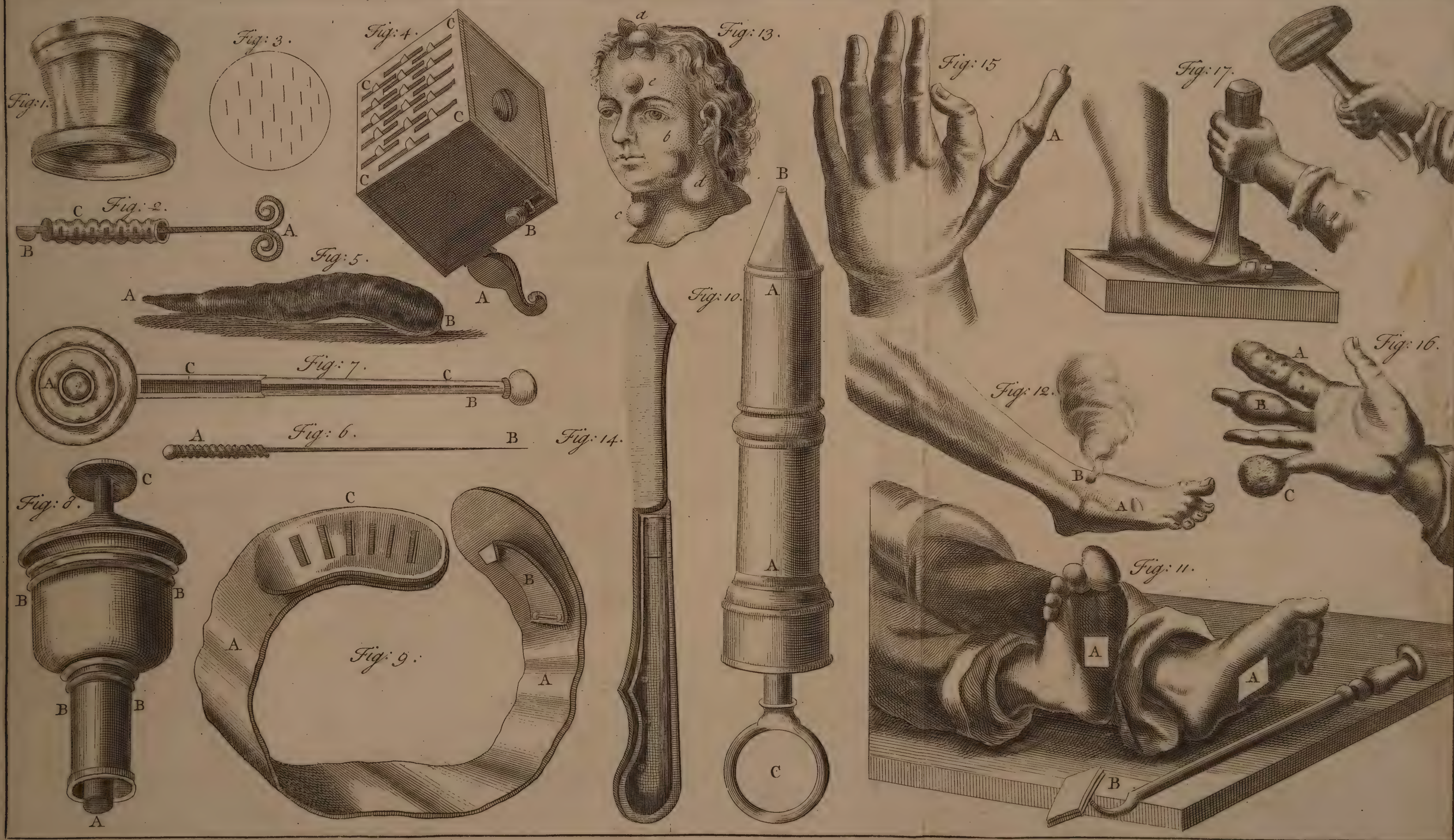
III. The Manner of amputating is chiefly threefold: Either 1. by a Pair of Method of amputating. strong Scissors, or rather sharp-edged Pincers, treating the Wound as we before directed in the preceding Chapter: Or, 2. by the Mallet and Chisel, *Tab. XII. Fig. 17.* with which the vitiated Parts are taken off at one Blow, as I have frequently done in cancerous Affections with a Caries or *Spina Ventosa* in the Fingers: And ROONHUYSE has also thus successfully amputated the great Toe, being scirrhus, notwithstanding what others may say against this Method. Or, lastly, 3. the diseased or mortified Parts are amputated by dividing in the next sound Joint with a Scalpel, leaving or drawing back a large Part of the Skin, to

* See PARÆUS, *Book XVI. Ch. 30.* SCULTETUS *Plate LIII. Fig. 2.* But by this Method the Bones are often splintered, or the nervous Parts lacerated; from whence arise dangerous Inflammations and Abscesses, and too frequently a Caries is the Consequence. DOUGLAS absolutely rejects the Forceps, the Mallet and Chisel, *Operat. Chirurg. Syllab. p. 45.*

wrap over the Stump, that it may heal the sooner. This last Method of amputating, is preferable to the former, in that you are, by this means, certain to avoid any supervening Caries, or a splintering of the Bone: For which Reasons I have used it with Success for removing Thumbs and Fingers, even of old People, in the Articulation of them with the Metacarpus, when they have been totally destroyed by a Caries or Mortification. Some indeed imagine this Method of amputating in the Joint to be not so convenient, because a Cicatrix or Skin cannot be induced over the Cartilage. This is, however, an Obstacle that I never yet met with, and may, at worst, be easily avoided by drawing back and leaving a large Part of the sound Skin on, and by removing the cartilaginous Extremity of the metacarpal or metatarsal Bone; by which means the Bone and Skin will more intimately unite and adhere. After the Amputation your Dressings must be made with scraped Lint, Compress, and Bandage, as we before directed. And, if the Patient be plethoric, in order to prevent Inflammation, or a future Hæmorrhage, it may be proper to take a few Ounces of Blood from a Vein. If any of the two foremost Internodes of the Fingers, should appear to be carious, and Part of the third, it is better to amputate the vitiated Part of the last by the Mallet and Chisel, which will more expedite the Cure, than to take off the whole Finger close to the Metacarpus by the Scalpel. But if the whole Finger or Toe is entirely corrupted, it must then be taken off in the Articulation close to the Metacarpus, leaving a good deal of the Skin. See Instances of great Toes amputated in LE DRAN, *Obs.* 112, 113, and 114.

An EXPLANATION of the TWELFTH PLATE.

- Fig. 1.* Represents the Cupping-glass used at present in *Germany*, and elsewhere, for dry Cupping, or for extracting Blood after Scarification.
- Fig. 2.* Is the Scalpel, or Scarificator, commonly used by our *German* Cuppers. A the Handle, B the Edge, C the Part which is struck extremely quick by the Finger, so as to make the Edge wound the Skin.
- Fig. 3.* Represents the Order or Position of the little Incisions made in the Skin by the Cupper, that they may all be cleanly covered by the Cupping-glass, *Fig. 1.*
- Fig. 4.* Exhibits the modern cubical Scarificator, making sixteen Incisions in the Order of *Fig. 3.* by one Stroke upon the Skin, and with very little Pain.
- Fig. 5.* Gives the Form or Shape of a Leech, for the Information of such as may be ignorant of that Insect: A the Mouth or Head by which it bites, B the Body and posterior Parts. But it must be observed, that one and the same Leech may, by differently contracting and expanding itself, appear in a hundred Shapes, so that its Length and Thickness are very uncertain.
- Fig. 6.* Is the Needle used by the Inhabitants of *China* and *Japan* for making their Acupuncturation, which they celebrate in most Disorders, as we do Phlebotomy. A the Handle, B the Point which enters the Flesh.
- Fig. 7.* Is the little Hammer used to strike in the preceding Needle: A the Head of this Hammer, B its Handle, CC a Case in the latter to deposite the Needle in.
- Fig. 8.* Represents the actual and concealed Cautery, used formerly for the making of Issues, and is, by some, denominated *Capsula Casseriana*. A denotes the End of the actual Cautery, or red-hot Iron, protruding itself beyond



yond the Case. B B is the wooden Case concealing the red-hot Iron from terrifying the Patient. C the Handle, by depressing which, the Cautey is forced into the Skin.

Fig. 9. Is a Machine to be used instead of Deligation for Issues in the Arm, to be made a little longer for those in the Neck, Leg, or Thigh. A A is a leathern Swath of about two or three Fingers Breadth. C C is a Brass-plate with several oblong Appertures, for intercepting the Hook B of the other Plate in the Manner of a Clasp.

Fig. 10. Shews the Syringe proper for injecting Liquors into the Urethra of Males, and the Vagina of Females, for various Uses. A A the Body of the Syringe, B its Extremity, ending with an obtuse Point instead of a small Tube, to prevent the injected Liquor from regurgitating and flying about. C the Ring or Handle of the Sucker, by which the Liquor is drawn into, and forced out of the cylindric Body.

Fig. 11. A A Shews the Parts of the Soles of the Feet, which the *Italian* Physician MISTICHELLIUS directs to be cauterized in Apoplexies, B the Square Iron Cautey for the Operation, which in that Disorder, he says, is highly serviceable.

Fig. 12. Represents the Method of burning the Part affected in the Gout with the *Indian Moxa*. A denotes the Cone of *Moxa* not yet fired, and B one that is burning.

Fig. 13. Gives a View of several encysted Tumors *a b*; of schirrhous Glands in the Neck *c d*; and of a fleshy Excrescence or Mark from the Mother, *e*.

Fig. 14. Represents the small Scalpel, which I generally use for extirpating schirrhous Tumors, or Glands in the Neck, Wens, or even schirrhous Glands of the Breasts.

Fig. 15. Represents the Hand of an Infant with six Fingers: In which A denotes the superfluous Finger with a Nail like a Cock's Spur, which I took off by a Pair of amputating Scissars or Pincers. This Instrument I also use in a *Spina ventosa*, or Caries of the Fingers,

Fig. 16. Is a Hand with a whole Index, A, carious, which I amputate close to the Metacarpus by the Scalpel Fig. 14. But then I also remove the Head of the first Phalanx, that the Wound may heal the sooner. B denotes a *Spina ventosa* in the middle Finger, and in the second Internode, which I amputate in the first Bone or Phalanx; C is a large Excrecence or Protuberance at the End of the little Finger, from the same Disorder, which I amputate in the second Bone, both of them by the Mallet and Chissel.

Fig. 17. Shews the Method of amputating the great Toe with the Mallet and Chissel, used by ROONHUYSE.

C H A P. XXXIV.

Of amputating the HAND, CUBITUS, and HUMERUS.

I. **T**HOUGH the Amputation of Arms and Legs is indeed, with some Reason, commonly esteemed one of the most terrible and severe Operations in Surgery, yet there are many Cases that occur daily in Practice, in which

In what Cases Amputation is necessary.

the Operation is absolutely necessary and unavoidable, in order to save the Life of the Patient. Such as, 1. When the Muscles of the Part or Limb are sphacelated^a; 2. Or when the Muscles and Bones are most violently contused and shattered; 3. When there is an incurable Caries, or *Spina ventosa*^b; 4. When the brachial, crural, or other large Artery, is either totally divided^c, or else wounded, so as to bleed incessantly without any Possibility of stopping the Hæmorrhage but by Ligature; in which Case 'tis hardly possible to preserve the Limb from mortifying, or save the Patient's Life without Amputation. 5. And, lastly, this Operation is necessary in those Tumors of the Hand and Arm, which arise from a *Spina ventosa*, or some other irremediable Cause, the Patient being tortured with the most excruciating Pains, as described by M. A. SEVERINUS^d, BIDLOE^e, RUYSCH^f, &c. In the mean time I would advise all prudent Surgeons, not to perform this Operation without there are other skilful Surgeons or Physicians, who also advise it, or think it necessary; by which means he may avoid many reflections, which are often unjustly thrown upon a Surgeon without such Precaution.

Method of
amputating
the Hand.

II. To proceed regularly with Amputations in the upper Extremities, we shall begin with that of the Hand; which may, on some Occasions, be amputated, in the Manner of the antient Surgeons, by one Blow with the Mallet upon a sharp Chissel fixed near the Carpus, as the Operation is represented in *Tab. LIII. of SCULTETUS, Edit. An. 1666.* But in reality this Method is often found to be not only unsafe, but even of dangerous Consequence, by violently contusing or fracturing some of the Bones and Parts in the Carpus. It is therefore not without Reason that the Moderns reject this Practice for that with the Knife and Saw; with which they take off the Hand more slowly indeed, but more securely, provided the Saw be not used to the Carpus or Metacarpus: Because the numerous Ligaments, Tendons, and small Bones there seated, cannot safely be divided by the rough Teeth of that Instrument. ^g The Practice of the modern Surgeons is therefore here much the best, who amputate the Hand by the Knife and Saw, cutting through the Bones of the Cubitus, as will presently appear.

What is to
be observed
in amputa-
ting the
Arm.

III. When the Hand, Cubitus, or Humerus, are required to be amputated upon the Account of some incurable Sphacelus, Caries, or other Disorder, there are then two Things chiefly necessary to be observed. The first of these is the *Place where* the Amputation must be made, which must at least be one^h or two Fingers Breadth above the mortified Part, never in the diseased Part it-

^a See *Part I. Book IV. Chap. XIV. preceding.*

^b See *Part I. Book V. Chap. VIII, IX. preceding.*

^c I have frequently stopped profuse Hæmorrhages from the brachial Artery by Ligature, and therefore it will not be so often necessary to amputate the Arm on that Account, as many Surgeons imagine and direct.

^d *Lib. de Abscess.*

^e *Exercit. Medic. Chirurg.*

^f *Epist. Anatom. Problem XIV.*

^g Yet there have been some Surgeons who have, in this Manner, amputated the Hand by the Saw in the Carpus or Metacarpus, as we learn from SCULTETUS, *loc. cit.* Nor is it impracticable, in my Opinion, to amputate the Hand in its Articulation with the Cubitus by the Scalpel, as in the preceding Chapter; though I must acknowledge myself to have never yet made the Experiment.

^h FABRICIUS AB AQUAPEND. L. 1. *Pentateuch. Chirurg. & Operation Chirurg. tit. de Sphacelo,* & SCULTETUS in *Explic. Tab. LIII.* are both of Opinion, in Opposition to HILDANUS, that the sphacelated Limb should be taken off in the diseased Part, near the sound; and what remains unsound, self.

self. Nor ought these larger Kinds of Amputations to be ever made in the Articulations: For (besides other Difficulties) there being no Flesh there to cover the Ends of the Bones, it will be almost impossible to heal the Stumpⁱ, or prevent a Caries in the Head of the Bone, with other bad Symptoms. The next Thing required after the proper Place for Amputation is assigned, according to the usual Method, is (2.) *the Provision and Preparation of the several necessary Instruments* and Parts of the Apparatus, which are to be laid in readiness upon a large Plate, or convenient Part of the Table; yet so as that they may be concealed from the Patient's View, who might be not a little terrified and disheartened by them.

IV. For the Sake of Beginners, we shall here enumerate the several Instruments necessary to compose the Apparatus for this Operation. These are, (1.) the *Tourniquet*, before described in *Part I. Book II. Chap. II. Sect. IX. & seq.* (2.) Some Ligatures, or Tapes, of a Finger's Breadth, and about an Ell and a half long. (3.) A middling-sized Knife (*Tab. XIII. Fig. 1.*) for dividing the Skin, to draw it back. (4.) A larger Scalpel, or Knife, of a crooked Figure (*Tab. XIII. Fig. 2.*) for dividing the Remainder of the Flesh. (5.) A Catlin, or double-edged Scalpel (*Fig. 3.*) for dividing the intermediate Flesh betwixt the Ulna and Radius. (6.) A Piece of Linen Cloth about three Spans long, and six Fingers Breadth, slit up lengthwise about half-way, as in *Tab. II. Fig. 17.* (7.) A well-tempered and sharp Saw^k (*Tab. III. Fig. 4.*) for dividing the Bones. (8.) A Pair of Pliers, or Forceps to hold the Ends of the Arteries, (*Fig. 5 and 6.*) (9.) Some crooked Needles, armed with strong Thread, or some Bits of blue Vitriol wrapped up in Lint or Cotton. (10.) Some small square Compresses, (*Tab. II. Fig. 21.*) (11.) A large Quantity of scraped Lint. (12.) Some astringent Powders, to stop the Hæmorrhage, or rather, as the former frequently inflames the Parts and impedes the Suppuration, provide some *Alcohol Vini & Oleum Terebinthinæ*, in proper Vessels, though in reality we may well enough omit all of them. (13.) A large Bolster of fine Tow, of a round Figure, and broad enough to cover the Stump, and retain the other Dressings: Or, instead of this, a Piece of the Fungus called *Lupi Crepitus*, or Puff-ball, of the like Size and Figure. (14.) A Calf's or Swine's Bladder, or else a large sticking Plaster cut in the Form of a *Malta* Cross, (*Tab. II. Fig. 15.*) or three separate Plasters, two Spans long and two Fingers broad, for investing and securing all the other Dressings on the Stump. (15.) A Compress in Form of a *Malta* Cross, but larger than the Plaster. (16.) A thick square Compress, to invest the End of the Limb. (17.) Three other Compresses of two Spans long and two Fingers Breadth. (18.) A Roller or Bandage for the Deligation of the whole, of about five Ells long and three Fingers Breadth. Lastly, (19.) Some Wine, and other cordial Medicines, to assist and relieve the Patient in case of a Deliquium.

The Instruments and Apparatus required.

be removed by the actual Cautery. This they recommend as the safest and easiest Method. But this Method is now rejected, on many Accounts, by the unanimous Consent of all modern Practitioners.

ⁱ But if a sufficient Portion of the Skin be left on to cover the Stump, it may perhaps heal as readily as the Stumps of Fingers thus amputated.

^k The Moderns have invented other Saws and Knives for Amputating, as may be seen in GARENGEOT'S *Tract. de Instr. Chirurg.* But these here described being equally as good in all Respects, I shall not insist on them.

V. The

Position of
the Patient,
Assistants,
and Surgeon.

V. The whole necessary Apparatus being thus provided, the next Business is for the Surgeon to dispose the Patient, Assistants, and himself in a proper Posture to begin the Operation. First, therefore, the Patient must be fixed on a low Chair or Stool, in the midst of the Room, the Surgeon standing betwixt his Legs, and six Assistants at least around him. One of these should stand behind the Patient to hold his Body; another on the Side of the affected Arm, which he is to hold fast by grasping the upper Part of the Cubitus: A third Assistant must hold the Hand, about to be amputated; and a fourth should stand on one Side with the Apparatus of Instruments, to hand them as they may be wanted by the Operator. A fifth Assistant must stand ready with the several Dressings, Compress and Bandage, necessary to complete the Deligation; and the sixth or last should be at Liberty to assist the Patient and Operator occasionally, in handing Wine, Cordials, or any other thing they may want.

What must
be done im-
mediately
before the
Amputation.

VI. Things being thus far advanced, the Surgeon, who should have a Napkin before him, to wipe his Hands when there may be Occasion, proceeds to fix the Tourniquet (*Tab. III. Fig. 1. K*) moderately tight about the Patient's Arm, in the Manner we before directed (in *Part I. Book I. Chap. II. Sect. IX. & seq.*) by which Means the brachial Artery will be compressed, so as to prevent any profuse Hæmorrhage: And the Nerve being also a Partaker of the same Stricture, will make the Patient less sensible of Pain from the Operation. But to prevent the Tourniquet (*Tab. III. Fig. 1. K*) from coming loose, the Turnstick must be held fast by the Assistant standing behind the Patient. But if you apply the Screw-Tourniquet, figured in *Tab. V. and VI.* they will adhere tight upon the Part, without being held by an Assistant. This done, the Assistant holding the upper Part of the Arm, should next draw the Skin strongly upwards, while the Surgeon applies the Tape tight, and circularly about the Part, a little above where it is to be divided, in order to secure the fleshy Parts close to the Bones, that they may be cut through more easily and evenly. Some, as VERDUYN, use a Leathern Strop with a Clasp, instead of a Tape or Fillet, for this Purpose, which we shall consider in *Chap. XXXVI. Sect. III.* following. The Surgeon now encourages his Patient with Expressions of Comfort, and with Wine, or Cordials, before he enters on the Operation.

The Opera-
tion itself
described.

VII. The Operation itself is next begun by an annular Incision made through the Skin, by the Surgeon, with a small Scalpel, the Arm being extended in a parallel or even Direction, by the Assistants: One of which is then ordered to draw the Skin upward as much as possible. The Surgeon next divides the Flesh, down to the Bones, all round, close by the Margin of the retracted Skin with the large crooked Scalpel (*Tab. XIII. Fig. 2.*) by which Procedure the Skin will wrap over the Stump, and the whole will be healed a vast deal sooner than by the Method formerly used. The Surgeon now takes the Scalpel, with which he divided the Skin, or else the double-edged Catlin, *Fig. 4.* and therewith cuts through the Flesh and Ligaments betwixt the Ulna and Radius; thereby also separating the Periosteum from the Bones where the Teeth of the Saw are to pass, to avoid violent Pain and Inflammation from a Laceration of that nervous Membrane by the rough Teeth of the Instrument. This is no sooner done, but the Assistants draw back the incised Flesh above and below, to open a Passage to the Bones. And that the Flesh above may be draw up as much as possible, to cut off the Bone higher than the Incision, you

must

must apply the slit Piece of Linen^a (mentioned before at N. IV. 6) so that its Heads being pulled upward by the Assistant who holds the superior Part of the Arm, he strives to elevate the Flesh, that the Bone may be taken off as high as possible, by which means the Stump will be more easily and neatly covered, and the Wound much sooner healed. The Surgeon must fix his Saw in this Operation, so that it may work upon both the Bones of the Cubitus at the same Time: Without which Caution, he will be liable either to cut one of them longer than the other, or else occasion a Fissure or Splintering of the single Bone, when it becomes so far divided as not to be able to bear the Stress of the Saw. He must also move the Saw gently at the beginning, till it is well entered: and then he may go on faster, but with Discretion: And to prevent the Saw from being pinched or obstructed in Motion by the Bones, the Assistant who holds the superior Part of the Arm should a little elevate the same, as the Hand should be a little depressed by the other Assistant, so as to make a Space large enough for the Saw to move freely: But this must be done gently and cautiously, for fear of breaking the Bones. And thus in one Minute or two the Amputation may be completed.

VIII. When the Surgeon has thus amputated the Hand with Part of the Cubitus, his next Business is, to make a strict Compressure and Deligation upon the larger Arteries to suppress the Hæmorrhage. But the better to discover the divided Arteries, the Surgeon must order the Assistant who holds the Tourniquet to relax the same a little: Or, if it be the Screw Tourniquet, *Tab. V. or VI.* he may loosen it a little himself; by which means the Blood starting from the Arteries, will shew their divided Orifices. If the Patient be plethoric, the Surgeon may be less sparing of the Blood at this Time, which must be received by a proper Vessel on the Floor: But in Case of Weakness, the Tourniquet must be instantly tightened again, to restrain the Flux. When the Cubitus is divided very low, near the Carpus, there will not be any great Occasion to secure the Arteries by a Ligature with Needle and Thread: Because the two or three Branches which run there, are but small, and may be well enough secured by Compresses of Lint with some Bits of *Vitriol. Roman.* or only by square Linen Compresses^b. But the Flesh and Ends of the Bones are to be well secured and invested with Dossils of dry Lint; over which again fix a large Piece of the Fungus called *Crepitus Lupi*, with or without a large Bolster of Tow, to be secured and retained on the Stump by a wet Bladder, or a Plaster cut in the Shape of a *Malta Cross*. Or, instead of a Plaster in that Form, you may more advantageously apply two or three long and narrow ones across each other, in the Form of a Star, upon the Stump; by which the Skin may be drawn down, so as to cover the Wound, and procure a speedy Cicatrification^c. Over the Plasters you are again to place a large Compress in Form of a *Malta Cross*, so

^a Some Surgeons use a thin Plate of Steel to elevate the Flesh, instead of this Piece of Linen.

^b M. CHABERT, in his *Obs. Chirurg. Paris. 1724*, asserts the Application of Vitriol to be here unnecessary: Since the Blood may be securely stopped, and the Arteries compressed, by properly disposing Linen or Lint formed into Dossils or Compresses about the Ends of the Vessels; securing them by a close Deligation or Bandage: Which, in weak Patients, I have found to succeed very well. Others think the Application of Caustics both unsafe and injurious, because the Eschar formed by the Vitriol frequently recedes or separates from the Vessel, and excites a profuse Hæmorrhage. V. RUYSCH *Epist. de nova Methodo Amputandi, &c.*

^c This Method LE DRAN highly recommends, *Obs. Chirurg. Tom. II. p. 309.*

that it may closely invest the End of the Limb, where it should be held by an Assistant while the Ends are brought up and applied round the Arm. And lastly, you must fix first, one large square, and then three long and narrow Compresses upon the Stump, so that the last may intersect each other in Form of a Star, and come up towards the Humerus. Then you finish the Deligation with a long Roller in the Manner we shall direct at large, in treating of Bandages for the Arm.

The Hæ-
morrhage
sometimes
suppressed by
the actual
Cautery, or
Ligature.

IX. Most of the antient, and not a few of the modern Surgeons, approve of the actual Cautery for restraining the Hæmorrhage from the divided Arteries. This Practice is deservedly rejected by the most expert Surgeons of the present Time; not only for the severe Torture it gives the Patient, but because it is at best very suspicious, and even dangerous, especially in Amputations of the Humerus or Femur: For the Eschar formed by the Cautery very often separates in two or three Days time from the End of the Vessel which is stopped, and thereby occasions a profuse, if not a fatal Hæmorrhage. However, the Use of the Cautery will be more likely to succeed in Amputations of the Cubitus or Tibia, than in the Parts beforementioned: But even here it is best to follow the Method at N. VIII. preceding, and never to have Recourse to the actual Cautery without absolute Necessity. Lastly, if, for the greater Security you are desirous of taking up the Ends of the divided Arteries with Needle and Thread, according to the modern Practice, (which, in my Opinion, is not very necessary in Amputations at the lower End of the Cubitus or Tibia) you are in this Case to take hold of the End of each divided Artery with a Pair of Pliers, termed the Crow's Bill (*Tab. III. Fig. 4. or Tab. XIII. Fig. 5 and 6.*) or some other of a convenient Make: And after passing round your crooked Needle with strong waxed Thread, with the latter you tie up the End of the Vessel.

Amputation
of the Hu-
merus.

X. When the Amputation is to be made above the Elbow in the Humerus, the Operation is to be performed almost directly in the same Manner as we prescribed for the Amputation in the Cubitus: Except that the brachial Arteries, of which there are sometimes but one, sometimes two or three, are to be always taken hold of with a Pair of Pliers, and secured by Ligature with a crooked Needle and waxed Thread, as we just before mentioned in N. IX. For in these large Arteries the Use of Styptics or Cauteries are found to be of little or no Efficacy. After the Extremities of the large Arteries are tied up, you must relax the Tourniquet a little, to discover the rest; which are to be also secured in the same Manner. Some Surgeons pass a small Needle and Thread through the End of the Artery, whilst held by the Pliers, joining the Thread with that with which they next make the Ligature: Which Method they take, in order to secure the Ligature from slipping off from the End of the Vessel. There are others, who, instead of extending the Ends of the Vessels with a Pair of Pliers, use a very crooked Kind of Needle, with strong waxed Thread, with which they perforate the circumjacent Flesh, first on one Side, and then on the other Side of the Artery, tying up a good deal of the adjacent Flesh together with the End of the Vessel, in order to prevent the Thread from cutting through the arterial Coats. But I think either of these Methods are rather inferior than preferable to the first, in which the Artery is extended with a Pair of Pliers, and then secured by Ligature with a crooked Needle and waxed Thread, passed round the End of the Vessel. For in the two latter Methods there is Danger
of

Fig. 2.

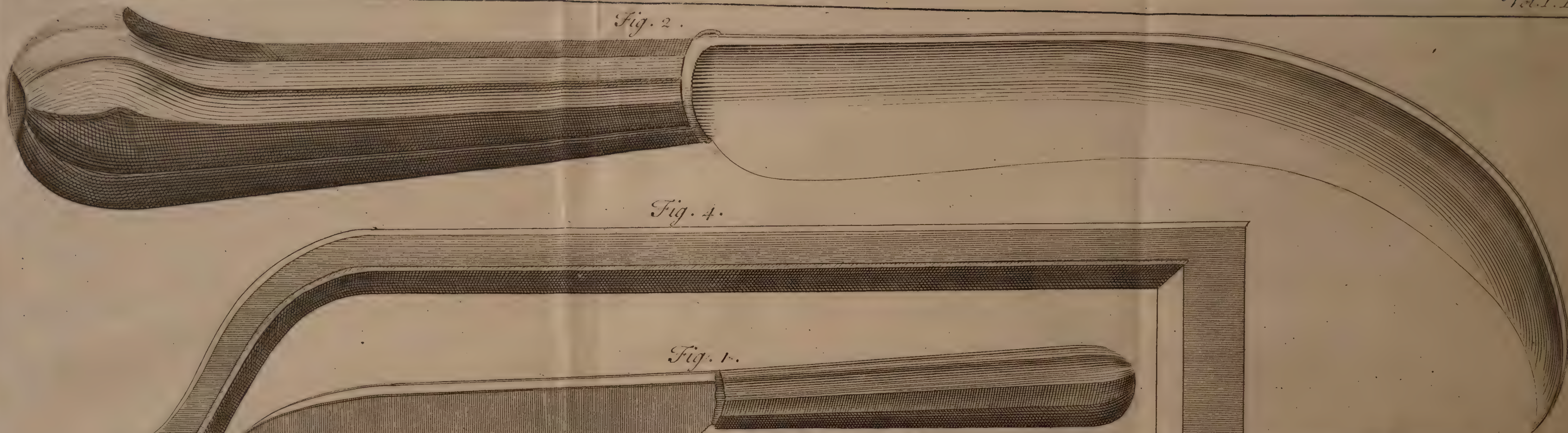


Fig. 4.

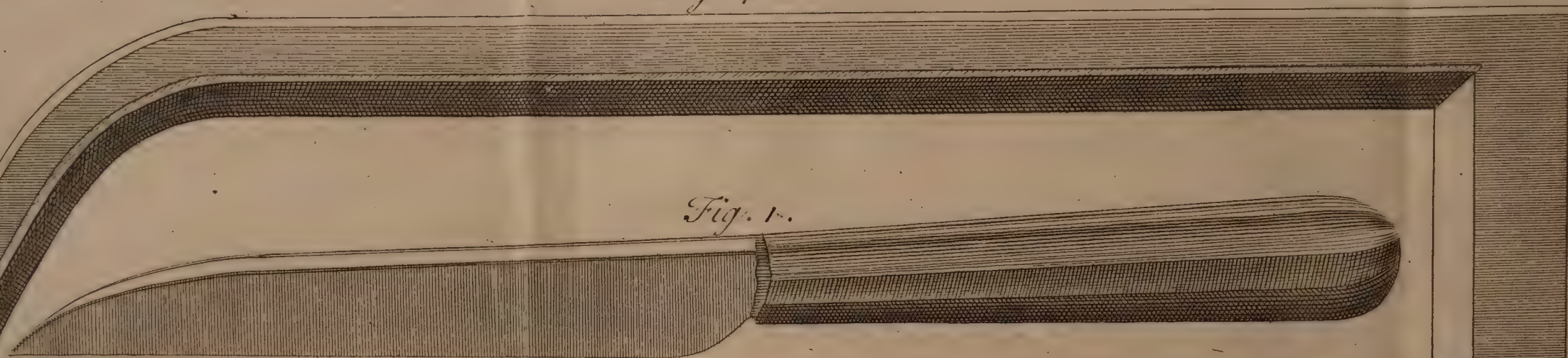


Fig. 1.

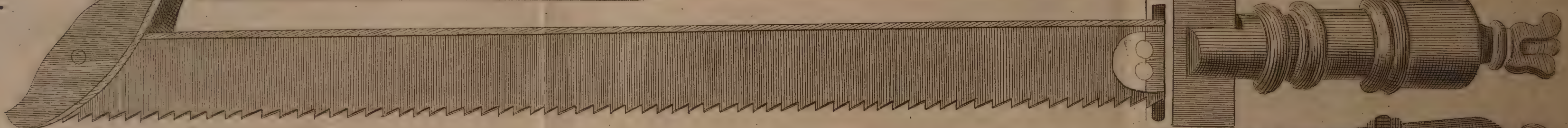
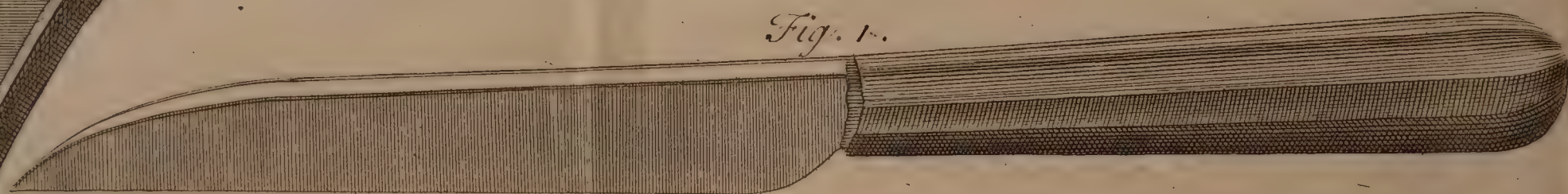


Fig. 3.

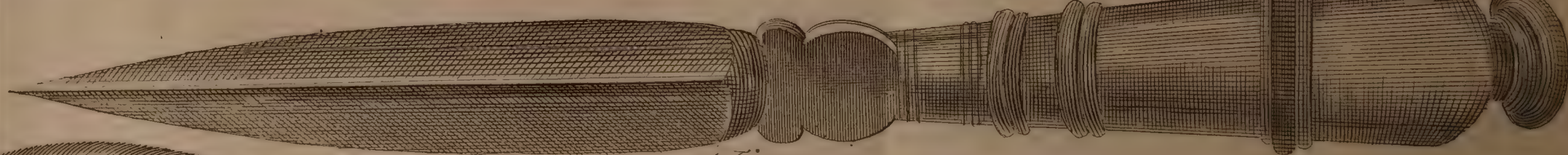


Fig. 6.

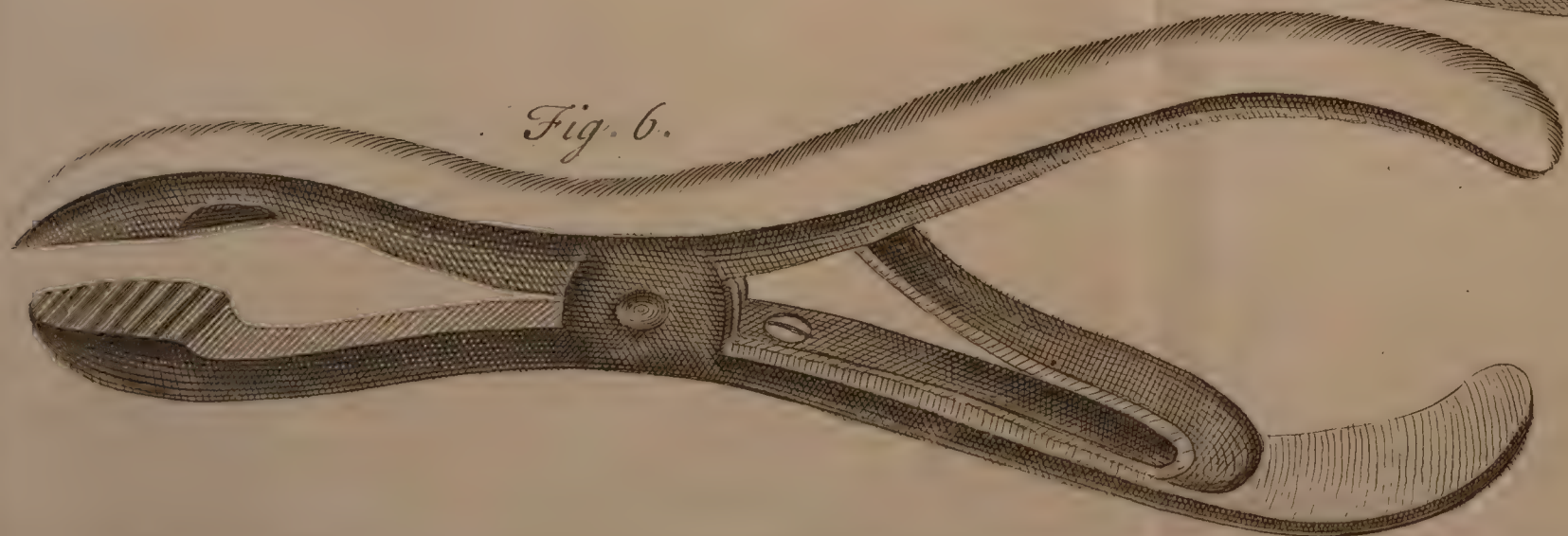
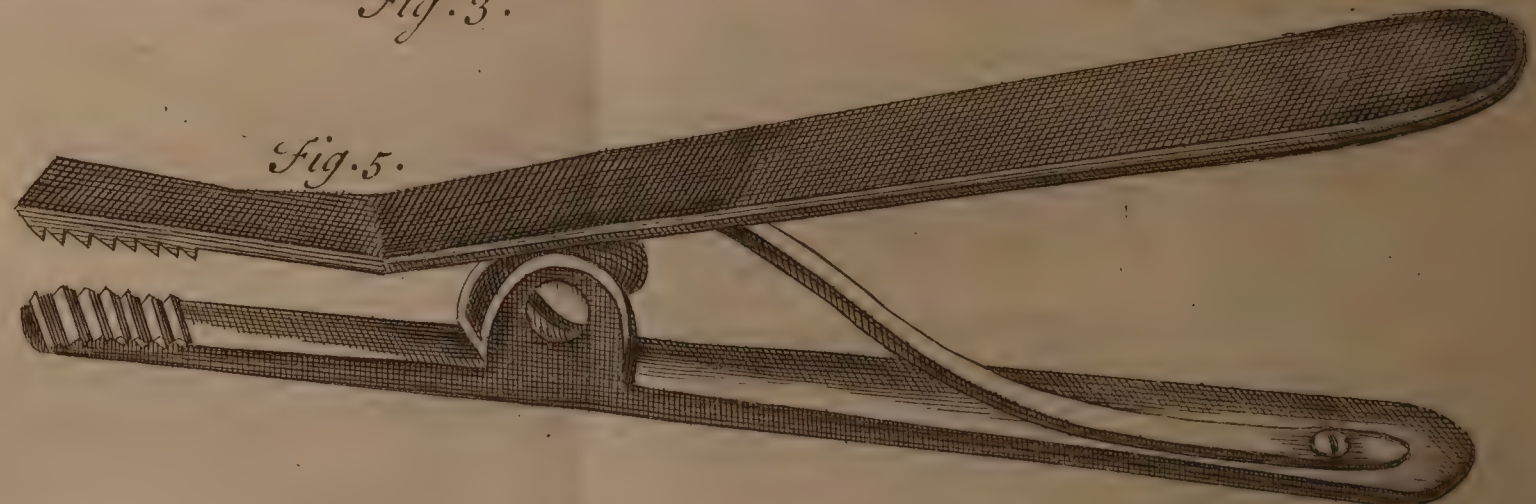


Fig. 5.



of passing the Needle wide of the Vessel, or at least the End of the Artery may easily fly back, or slip out of the Ligature^a.

XI. When you have dressed the Stump, and compleated the Deligation, according to N.VIII. the next Business is, to give the Patient a Draught of Wine or some Cordial; and when he is laid down upon the Bed, the End of the amputated Arm should be compressed by the Hands of an Assistant for some Hours, which will not only make the Dressings adhere more closely, but also prevent any consequent Hæmorrhage. This done, you may, by Degrees, relax the Tourniquet sufficiently to admit of the Blood's Circulation through the Part: And if, upon the Relaxation of it, you meet with no Blood from the Wound, it is a Sign the Operation has been well compleated. In the next place you must recommend Rest to the Patient, and order some nourishing Emulsion instead of common Drink, and paregoric Draughts to be repeated at proper Intervals; that he may hereby recover his lost Strength, and be eased of his Pains by Sleep. The next Day you may again loosen, or else totally remove the Tourniquet, and give Orders for a proper Diet and Regimen, such as will abate the febrile Heat and Motion of the Blood, and secure the Patient from a fresh Hæmorrhage, as in *Part I. Book I. Chap. I. N. XLIII.* These Accidents may be still better prevented by the Use of Phlebotomy at Discretion, with cooling Draughts and Powders: But Venesection must be avoided, when the Patient is weak, or has lost much Blood. If a fresh Hæmorrhage should appear, so as not to be suppressed by the Application of another Compress and Bandage, with compressing the Stump for some time with the Hands, (which are generally sufficient) in that Case you must re-apply the Tourniquet; and, after removing the Dressings, make a fresh Ligature upon the Ends of the Arteries. Or, if the Ends of the Arteries cannot be taken hold of, you may apply the actual Cautery, and defend the Stump with a larger Quantity of Lint, then secure it with an exact Deligation and Compressure for some time by the Hands, till the Hæmorrhage ceases.

Treatment
after the
Dressing.

XII. The first Dressings and Bandage ought not to be removed from the Stump before the third or fourth Day, when the Mouths of the divided Vessels may be supposed to be well closed and united: But in Case of Accidents, intense Pains, Inflammation, Hæmorrhage, or the like, you must renew them sooner. Nor is it amiss to order a Servant to attend constantly for the first Week at the Patient's Bed-side, provided with a Tourniquet, with which an incidental Hæmorrhage may be suppressed, till the Surgeon can be called to renew the Deligation. But if every thing succeeds well, in renewing your Dressings, you ought to remove them one after another very tenderly, and those which are next, or adhere to the Wound, should not be touched at all, much less violently forced away, if you are desirous to avoid irritating the Part, and inducing an Hæmorrhage. 'Tis in this Case much the best for you to leave the adhering Dressings upon the Part for a few Days, and to moisten them at each Dressing with warm Wine or its Spirit, till they become loose, and separate spontaneously in the Suppuration, without using any Violence. After the first Dressing, you need not dress again above once every other

When and
how to re-
new the
Dressings.

^a See DOUGLASS, *Syllabus Operat. Chirurg.* p. 44, 45. where, after the Amputation, he advises the Surgeon to unite the Skin crosswise.

Day, or every Day at most, except your Discharge be great, and in the Summer time.

What is to
be observed
In the Dress-
ings.

XIII. In renewing your Dressings, it is chiefly necessary for you to observe, that your Wound be well and gently cleansed from all the foul Matter with Lint, and then to dress it with flat Plates or Pledgits of scraped Lint; of which that next the Wound should be moistened with some digestive Ointment, and the rest applied dry. The Pledgits of Lint are to be secured and retained upon the Stump by three, four, or six sticking Plasters of *Emp. Diapalmæ*, or the like, of about a Foot in length, and a Thumb's breadth, crossing each other upon the Part like a Star. Over these Plasters must again be fixed a large square Compress; and over that three other long and narrow Compresses in a stellar Position, securing the whole by Deligation with your Roller. When your Dressings have been thus continued for about a Fortnight, there will not be occasion for so much Lint, nor so many Compresses as at first: Nor need you then make your Bandage so tight, as there is no Danger of any Hæmorrhage. But in the mean time you must continue to treat the Wound with digestive Ointments and vulnerary Balsams, retained with Lint, a Plaster, Compress, and Bandage, as in other Wounds, till it be healed; which usually happens in about two Months. For the rest, it may be here proper to advise the Surgeon to apply the Tourniquet, before he removes the first Dressings; especially in Amputations of the Humerus or Femur, in order to prevent an Hæmorrhage: Or at least the brachial Artery should be compressed in the Middle of the Arm by the Thumb of an Assistant.

Treatment
of the Fever.

XIV. Lastly, as Amputations are often followed soon after with a Fever, especially in plethoric and strong Habits, it will, in that Case, be necessary to use Phlebotomy with paregoric and cooling Medicines, joined with a proper Regimen and Diet: Without which there may be Danger of losing the Patient, either by the Violence of the vulnerary Fever, as it is termed, by a Sphacelus of the Part, or other bad Accidents.

AN EXPLANATION of the THIRTEENTH PLATE.

Fig. 1. Exhibits a small sized Scalpel, more commodious for dividing the Skin and Flesh in Amputations than the large crooked one following.

Fig. 2. Is the large crooked or falciform Knife, commonly used for dividing the Flesh to the Bone in Amputations of the upper and lower Extremities, though in most Cases I prefer the small one, *Fig. 1.*

Fig. 3. The Catlin, or double-edged Scalpel, for dividing the Flesh and Ligament betwixt the Bones of the Cubitus and Tibia; which may be also performed by a less and single-edged Scalpel, like that in *Tab. I. G.* This Knife is also used in the Method of amputating the Tibia, which preserves the Calf.

Fig. 4. Represents the Saw used for amputating Bones of the Limbs. This Instrument is by many delineated as large again as our Figure of it: But a Saw of the same Size, or but little larger than our Figure, will perform the Operation as well, and even more commodiously than a larger. This and the two preceeding Instruments are usually embellished with various Ornaments; which may serve to encumber them, and enhance their Price, but can add nothing at all to their Usefulness.

Fig. 5. Re-

Fig. 5. Represents a Pair of Pliers, furnished with Teeth at one End, and a Spring at the other, for taking hold of the Ends of divided Arteries, in order to secure them by Ligature with strong Thread, and stop their bleeding in Amputations of the upper and lower Extremities.

Fig. 6. Is another Pair of Pliers for the same Use, taken from M. GAREN-GEOT; which may be also made with very flat or no Teeth at the End, to avoid injuring the Coats of the Artery.

C H A P. XXXV.

Of Amputating the FOOT and LEG.

I. **T**HE antient Surgeons, in Amputating the Foot at the Tarsus or Meta-<sup>The Place for amputat-
ing the Ti-
bia.</sup> tarsus, used a large Chisel and Mallet, and sometimes a Pair of large Cutting Pincers, with which they separated the diseased Parts, and then treated and healed the Wound with Balsams in the usual Manner: Which Practice is confirmed and explained by SCULTETUS, in his *Armament. Chirurg. Tab. LIV.* But as the Tendons and Ligaments, seated in those Parts, are, in this Method, violently lacerated and contused, the modern Surgeons have therefore justly preferred the Amputation of the Toes and Metatarsus by the Scalpel; conducting the Remainder of the Cure as in other Wounds; And in this Manner the Leg may be much better supported by the Heel or Stump, than by a wooden Machine^a. But because they were afraid of this Practice, from the Difficulty of covering the Bones, and healing up the Wound, they rather followed the more dangerous Method of Amputating the Leg about four Fingers Breadth below the Knee, instead of taking it off in the lower Part of the Tibia. By this Means, though they cut off a large Part of the Leg which was not yet disordered, they avoided the Deformity and Inconvenience in sitting down, which the Patient would have met with from preserving it on: For a long Stump of the Leg can neither be stood upon nor well adapted to a wooden Machine. Therefore it was thought most convenient to amputate it in the upper Part of the Tibia, about a Hand's Breadth below the Patella, to avoid injuring the Tendons of the flexor Muscles, and the better to adapt the Knee to a Silver or wooden Leg. I am indeed sensible that many Surgeons, even at present, approve of Amputating no higher than the Disorder has spread itself, agreeable to the Advice of SOLINGEN, VERDUYN, and DIONIS. But I think their Authorities ought to be but little regarded; not only because of the Difficulty there will be of adapting a wooden Machine to the lower Part of the Tibia above the Ankle, but also upon the Account of the Deformity which the long Stump of the Leg will occasion, if the wooden Machine is adapted to the Knee.

II. With regard to the Instruments and Dressings used in this Operation, they are almost the same which we before described for Amputating the Arm; Only it may be here necessary to add a few Cautions which relate more particu-<sup>Observations
peculiar to
Amputati-
ons of the
Tibia.</sup>

^a This GARENGEOT advises, *Oper. Chirurg. Tom. III. p. 417. Edit. 2.*

larly to Amputations of the Tibia. These are, (1.) To place the Patient upon a low Seat or Bed, so that he may lean backward, and extend his Legs^a. (2.) To shave off the Hair with a Razor from the Part where the Amputation is to be made, to prevent the Plasters, afterwards applied, from adhering to them, so as to give the Patient intense Pain in removing them. (3.) To secure the divided Arteries, which appear in the Stump of the Tibia, rather by Ligature, with Needle and Thread, than by Styptics, or actual and potential Cauteries. For though these Arteries do not appear very large, yet if they are not secured by Ligature, they generally open and bleed profusely soon after the Deligation; especially if the crural Artery be not well secured with narrow Compresses and Bandage. (4.) The crural Artery is to be compressed with the Tourniquet, either of the common Sort, turning with a Stick, or the modern Screw Tourniquet. Or else you may make a strict Ligature above the Knee with a Bandage twisted in a cylindrical Form, so as to compress the Artery descending in the Ham, as in *Tab. XIV. Fig. 4. D.* Yet, in my Opinion, it is much better to apply the same Ligature higher up upon the Thigh, in order to compress the Artery, especially when the Tibia is to be amputated near the Knee. See *Tab. III. Fig. 1. LM*; by which means the Dressings may be more conveniently applied after the Operation, than if the Tourniquet was fixed nearer to the Knee.

VERDUYN'S
Method of
Amputating.

III. We have another new Method of Amputating the Tibia proposed by VERDUYN, in a Dissertation upon the Subject in the Year 1696: Which Practice he strongly recommends for the publick Good; though he does not pretend to be the original Author of it. There are indeed many who attribute the Honour of inventing this Operation to one SABOURIN of *Geneva*, as GARENGEOT, and some other Members of the Royal Academy; who assert, that in their Time VERDUYN performed the Operation first at *Geneva*, and then at *Paris*. At the same time I find the Operation described and performed by the *English* Surgeons LOWDHAM and YOUNG, in an *English* Treatise concerning the wonderful Virtues of Oil of Turpentine in Hæmorrhages, together with a new Method of Amputating, by JAMES YOUNG, 8^{vo} *Lond.* 1679. The same Operation was afterwards improved and described by my Friend KOENERDINCUS, Surgeon of the Hospital at *Amsterdam*, in his *Dutch* Treatise *De Gangræna & Sphacelo, Cruraque amputandi Ratione veteri ac nova*, 8^{vo} *Amstel.* 1698; which was the same Year in which VERDUYN twice performed this new Method of Amputation. A brief Description of which is as follows.

IV. First, the *Tendo Achillis* is divided from the Ankle by the Scalpel, *Tab. XIII. Fig. 3.* then a longitudinal Incision is made upwards, and the Tendon separated from the Bones of the Leg as high as the Part where the Bones are to be amputated by the Saw: See *Tab. XIV. Fig. 4, 5, 6, 7.* This done, the Flesh composing the Calf of the Leg, *Fig. 6. A.* is drawn backward with a Cloth towards the Ham, by the Hand of an Assistant: And then the Integuments and Flesh upon the Forepart, and betwixt the Bones, are divided in the usual Manner, by a proper Scalpel, *Tab. XIII. Fig. 1 and 3;* and the Bones next amputated by the Saw. Then the Flesh is brought over, and adapted to

^a HILDANUS in this Case places the Patient on the Ground, but his Foot on a low Stool.

the Stump of the Tibia, after it has been first washed with Spirit of Wine: and if there be any unequal and superfluous Parts, they are cut off with a Scalpel; the Remainder being retained in its proper Situation by sticking Plasters, or a few Stiches with Needle and Thread. Lastly, Compresses with a wet Bladder and Bandage are applied in the Manner we before directed, in treating of Amputations in general: Or, instead of them may be used a retentive Machine, figured by VERDUYN and GARENCEOT, for the Purpose, being made of Leather, with Straps and Buckles, by which the Stump being secured, it is then to be compressed for a few Hours by the Hands of an Assistant, till there is no Danger of an Hæmorrhage. To prevent that, you may also apply the Screw Tourniquet, *Tab. V. Fig. 6.* or *Tab. VI. Fig. 1.* Thus the Operation is compleated, the Advantages of which to the Patient, according to the forementioned Authors, are many. As, (1.) The Calf of the Leg being thus preserved and adapted to the Stump, closes and compresses the Mouths of the divided Arteries, so as to prevent an Hæmorrhage, without the Use of Cauteries, or the Application of Ligatures. (2.) The Ends of the Bones being thus immediately covered with the Flesh, are not so liable to be infested with a Caries, as they frequently are in the common Method, which greatly retards, if it does not frustrate the Cure. (3.) The Flesh of the Calf readily unites with the Ends of the divided Bones of the Leg; so that by treating the Wound with vulnerary Balsams, in the subsequent Dressings, the Cure is speedily compleated. Lastly, (4.) The Flesh thus adapt to the Ends of the Bones, serves as a Pillow ever afterwards to support them; so that the Patient may easily sit down, without being obliged to bend the Stump, as he must do after the common Method. Add to this, that the Stump may be adapted perpendicularly to a hollow wooden Leg, so that the Patient may stand or walk upright upon an artificial Leg, as upon his natural one. Every time the Stump is dressed, the Portion of Flesh which wraps over it, must be gently supported, and pressed up against the Ends of the Bones, that its Weight may not make it separate or subside, so as to prevent its uniting. A more particular Account of this Method may be seen, illustrated with proper Figures, in the forementioned Treatise of VERDUYN.

V. Notwithstanding the before-described Method had been several Times performed with Success by VERDUYN, and some others, yet it met with the Approbation of but few Surgeons: So that it was not able to prevail over the common and received Method of amputating the Tibia. Infomuch, that it was soon after deserted even by its own Patrons, VERDUYN and KOENERDINGIUS: To which add, that the Patient, upon which SABOURIN performed this Operation at *Paris*, died soon after it, as did several at *Amsterdam*; at which last Place several Patients were troubled with acute Pains, and other bad Accidents, from little Splinters, or the rough Ends of the Bones irritating the Flesh, even after the Stump was healed up: Not to mention the large Quantity of Blood lost by SABOURIN's Patient, which was even greater than in the common Method of amputating; which, with other Inconveniencies, induced KOENERDINGIUS to prefer the common before this new Method, in his Treatise on this Subject. Notwithstanding all this, we find M. GARENCEOT, who seems to be ignorant of the forementioned Writings of YOUNG and KOENERDINGIUS on the Subject, endeavouring lately to recommend and re-establish this uncommon Method of Amputating: As may be seen in *Chirurg. Operat. Chap. of Amputations of the Tibia.*

VERDUYN
deserts his
Method.

Tibia, M. GARENGEOT there relates, that there were several Men then living in France, who had the Operation happily performed on them in this Manner; so that they could not only sit down easily, but also leap very nimbly. But if we would reasonably expect to succeed in this Method, the Patient ought to be not only healthy in all other respects, but the Cause, which requires the Limb to be amputated, should be from some external Violence.

The same Method practicable in the Humerus.

VI. Lastly, it is to be observed, that the new Method of amputating, which we have been now describing, may, according to the Opinion of our modern Surgeons, be not only performed in the Tibia, but also in the Cubitus, by preserving a Quantity of the Flesh and Integuments, to wrap over the Ends of the Bones. Agreeable to this, the Operation was in the same Manner performed with Success by RUYSCH, in the Presence of VERDUYN and BORTOLIUS his Kinsman. See the Treatises on this Subject by YOUNG and KOENERDINGIUS; also RUYSCHII *Epist. Problemat. XIV. de nova Artuum decurtandorum Methodo*.

CHAP. XXXVI.

Of Amputating the THIGH.

Amputation of the Femur, when necessary.

I. **T**HE Surgeon frequently finds it necessary to amputate the Leg above the Knee, removing Part of the Thigh itself, when a Mortification has reached the Joint, or when the lower Head of the Femur is carious, sphacelated, crushed to pieces, or the large crural Artery irrecoverably wounded. In these Cases the Success of the Operation is very dubious, especially when the Amputation is made very high up in the Thigh. Nor is the Patient in Danger of being lost only from a profuse Hæmorrhage, from the Division of so large an Artery as that of the Femur; but the Quantity of Matter discharged daily from so large a Wound does often so much extenuate and weaken the Patient, that he cannot subsist till the Cure is completed. Therefore whenever the Surgeon finds it necessary to amputate in the Femur, he ought to do it as low as possible, as near within three Fingers Breadth of the Knee as he can, leaving a good deal of Flesh, and more of the Skin, to wrap over the End of the Stump: By which means the Cure of the Wound will be much expedited, the Discharge of Matter at each Dressing rendered less profuse, and the Patient, not being so much impaired in his Strength, will be more likely to get happily through the Cure.

Application of the Tourniquet.

II. The Application of the Tourniquet for compressing the crural Artery, whether it be the common one with the cylindric Ligature and Turn-stick, or the Screw Tourniquet, must be made upon the upper and internal Part of the Thigh, as near as you can to the Place where the Head of the internal Vastus Muscle and the Triceps touch each other, as in *Tab. III. Fig. 1. L M*. Without this Precaution you may be liable to have such a profuse Hæmorrhage from the large femoral Artery as will inevitably destroy your Patient; which frequently happened to the antient Surgeons before the Invention of the Tourniquet.

III. With

III. With respect to Amputations of the Thigh in general, little more need be added to what has been said on this Operation in the Arms and Legs: As in the first Place, to let the Hair be shaved off, and after you have made a circular Incision through the Integuments with a small Scalpel, *Tab. XIII. Fig. 1.* to extend or draw them upwards as much as possible before you divide the Flesh, or Muscles, which last you must amputate a good deal higher than the circular Incision through the Integuments. You may cut through the muscular Flesh at your second Incision, either with the Scalpel, with which you divided the Integuments, or with the Knife for amputating Breasts in *Tab. XXII. Fig. 7.* or else with the large crooked Knife in *Tab. XIII. Fig. 2.* With either of which you must cut all round close to the Bone: By which Method of proceeding you will have the Stump of the Bone covered over with Flesh and Skin in a little time, so as to be healed in a few Days; and at the same time you avoid the risque of a Caries in the Bone from its being exposed to the Air, as we once before observed. For want of this Precaution in Amputations of the Thigh, when the Muscles have been divided even with the Integuments, the Muscles have contracted, and drawn themselves up to such a Degree, that I have frequently seen the Bone standing out like a Stick for above two or three Fingers Breadth from the Flesh. In this Case the Patient must be a long Time, and be much weakened by the Discharge of Matter, before the Muscles can be extended and brought down, so as to cover the End of the Bone, without which the Cure can never be completed. With regard to the Hæmorrhage in Amputations of the Thigh, that must be always prevented by making an exact Ligature upon the femoral Artery, which is much too large to be safely secured by any other Method; and, for the same Reason, your Ligature upon it must be very firm and secure, by tying it up with a strong Thread passed round after the End of the Artery is extended or drawn a little out from the Flesh with a Pair of Forceps, or a Tenaculum, *Tab. XIII. Fig. 5. and 6a.* If there appear to be more large Arteries than one divided, they must be also secured by Ligature in the same Manner; but for the smaller Arteries, it may be sufficient to close them by Styptics, or Vitriol, and Dossils of scraped Lint without Ligature. The Dressings and Deligation are to be much the same for an amputated Thigh, as we before directed for an Amputation of the *Humerus*: Only the Quantity of Lint, Fungus, Bladder, Compresses, &c. must be proportionably larger, and the Bandages much longer. To which you must here add a long, thick, and narrow Compress, to be imposed all along the Thigh over the crural Artery, and secured there by a Bandage peculiar to itself: Or, instead of this, you may fix the Tourniquet, *Tab. V. Fig. 6. or Tab. VI. Fig. 1.* and leave it upon the Limb for some time. The Deligation being completed, and the Patient put to Bed, his Thigh must be placed in an easy elevated Posture on a Pillow, that the Impetus of the Blood, on the End of the Artery, may be less than in a direct Position: Which will greatly conduce to the Prevention of a fresh Hæmorrhage. Lastly, the Stump should be compressed for some Time by the Hands of an Assistant, ordering a proper Diet, Regimen, Medicines, &c. as we observed in Amputations of the *Humerus*.

The Method
of Amputat-
ing and
Dressing the
Femur.

* PETIT gives a Description of another Ligature, *Mem. Acad. Reg. Paris.*

Treatment
of Limbs
amputated
by Gun-shot.

IV. If Part of the Leg or Arm should be carried away by a Bullet-shot, or Cannon-ball, or be torn off by a Cart-wheel, or Mill, or some such other Machine, the first Step to be taken by the Surgeon in these Cases, is, 1. immediately to apply the Tourniquet to compress the Artery, and stop the Hæmorrhage; And then, 2. To cut off the rough End of the Bone by the Saw, or cutting Pincers, that there may be no Points, or Splinters to irritate the sensible and fleshy Parts. But if there are no Splinters, or rough Parts, the Surgeon need not cut off any thing. Lastly, 3. To secure and close up the Ends of the wounded Arteries, either by Ligature, when they are large and accessible, or else by the Cautery, or by Compressure with Lint, Styptics, and Compresses, according as particular Circumstances may indicate to the Surgeon. Which being performed, the rest of the Dressings and Deligation are to be completed in the Manner we have before directed for other Amputations.

BOTAL-
LUS's Me-
thod of am-
putating re-
jected.

V. The celebrated French Physician BOTALLUS formerly invented a very expeditious Method of amputating Limbs in an Instant, by letting a sharp Instrument fall down upon them from a certain Height loaded with a great Weight; by which means the Limb is struck off at one Blow, without the Use either of Knife or Saw. BOTALLUS has been also seconded in this Method of amputating by HILDANUS. Notwithstanding which, the Artifice has been reasonably rejected by almost all the prudent Surgeons, who have succeeded them: For it is hardly possible that a Limb should be taken off in this Manner without shattering or splintering the Bone. Consult BOTALLUS in his Treatise, *De Vulneribus Sclopetorum*.

The adapt-
ing of artifi-
cial Limbs.

VI. After the Stump is healed up, the Surgeon may provide an artificial Limb of Silver, for those who can afford it, or of Wood for others; adapted to the Stump, so that it may be fastened on by Straps and Buckles, or by Springs. Of these Machines we are furnished with various Specimens in AMB. PAREY, HILDANUS, SOLINGEN, &c. and by our modern Artists, who make these kinds of Instruments, and other curious Machines. But, for the poorer Sort, it may be sufficient to supply them with a wooden Machine, turned and cut into a proper Shape, with a Hollowness or Cavity at the upper End for receiving the Stump of the Knee, that they may, by this means, be enabled to walk, or sit down, though not in an elegant Manner.

Removal of
a Caries.

VII. As a Caries of the Bone is no unfrequent Accident in Amputations, the Surgeon should therefore endeavour to guard against it as much as possible: Even at its very first Appearance he should strive to remove it, either by the Application of *Euphorbium*, or the actual Cautery, because it prevents the Progress of the Cure; notwithstanding the Writers in Surgery usually pass by this Accident, without taking notice thereof. There still remains a Practice which, in my Opinion, will very often succeed beyond either *Euphorbium*, or the Cautery; and that is, to exfoliate or pare off the diseased Parts of the Bone with a Knife or Rasp till you come to the sound: By which means the Flesh will then readily unite with the Bone to complete the Cure, which it cannot while the Caries remains.

* PETIT has described a Machine for suppressing the Hæmorrhage in the crural Artery after this Amputation, which will effect it without a Ligature on the Artery, or any other Method above-mentioned. *Mem. Acad. Reg. Paris. A. 1731.* This Machine you will find in my Plate XXXIX. with a particular Description of it.

C H A P. XXXVII.

Of Amputating the ARM in its Articulation with the SCAPULA.

I. **T**HOUGH I never yet attempted to amputate the Humerus in its Articulation with the Scapula, nor so much as found it treated of by any of our Chirurgical Writers, except LE DRAN, *Obs.* 43 and 44. after whom the Operation is described, without mentioning his Name, by GARENGEOT, (*Chirurg. Operat. Cap.* LIV.) yet, that the Surgeon may not be ignorant of what has been advanced on this Head, I shall make it the Business of this Chapter to give a brief Description thereof.

The Design
of this
Chapter.

II. According to the two last mentioned Authors, there are two Cases in which it may be necessary to amputate the Arm in its Articulation at the Shoulder. The first is, when the upper Part of the Humerus is violently confused and shattered by a Cannon-ball, Bomb, or Grenade. The other Case is, when the upper Head of the *Os Humeri* is irrecoverably vitiated from some internal Cause, as from an Abscess, a Caries, or *Spina Ventosa*: To which we may add, a Mortification of the Arm extended to the Shoulder, &c.

When the
Arm may
be thus am-
putated.

III. But before you enter on this dangerous and difficult Operation, it will be absolutely necessary to have every Member of your Apparatus of Instruments and Dressings prepared and disposed each in their proper Order: After which you are to fix the Patient upon a convenient Seat with his Face covered. You must next observe, that the Tourniquet is not here fixed upon the Arm, as we before described for the common Amputation of it: But that Instrument is, in this Case, laid aside, and the Trunk of the brachial Artery is first secured by Ligature in the following Manner, before you begin to amputate.

Previous Re-
quisites for
the Opera-
tion.

IV. The Patient being properly seated, with his Arm extended, and secured by an Assistant, you must then carefully search out the true Seat and Course of the brachial Artery at the Axilla: In doing which you will be much assisted by being previously versed in the Anatomy of the Part. If the Tumor should be so large as to prevent your Investigation of the Artery, by feeling through the Integuments, you make a longitudinal Incision through them to the Bone, on each side the Arm, so that you may pass your Fingers by the Bone, and discover the Artery. Which done, you must then pass a large Needle^a with six or eight Threads through the Flesh within two Fingers Breadth of the Cavity in the Axilla, so that the Needle may pass through close to the Bone, and betwixt that and the Artery, without injuring the latter. The Needle and Ligature being thus conveyed betwixt the *Os Humeri* and Artery, the Arm is now let down a little, to relax the Skin, and the Ligature is then tied with a Surgeon's Knot. Your next Business is, to examine if there be any Pulse in the Artery below the Ligature as it runs down the Arm: If so, your Ligature must be drawn tighter till you can perceive no Motion there: And then your Ligature must be secured from getting loose by a Knot or two more.

What is to
be first done
in the Opera-
tion.

V. There are three Things chiefly necessary for you to observe in the Operation, after the Artery has been thus secured by Ligature to prevent a fatal Hæ-

What is to
be observed
in the Opera-
tion.

^a LE DRAN uses a strait Needle; but GARENGEOT recommends a crooked one, like that to be seen in *Tab.* XIV. *Fig.* 10.

morrhage. These are, 1. To leave Skin and Flesh enough upon the Shoulder; 2. To cut through the muscular Flesh in the most convenient Manner; and lastly, 3. To divide the capsular Ligament which invests the Head of the Bone, and connects it to the Scapula, so that it may be taken out of the glenoid Cavity in the latter, and be afterwards amputated entirely. To perform each of these Intentions with Success and Dexterity, the Surgeon ought previously to make himself well acquainted with the Nature of the Articulation, with the Position of the *Processus Acromion*, and to be careful that a sufficient Quantity of Skin be preserved and drawn back to wrap over the Wound; and, lastly, to amputate with his Scalpel two or three Fingers Breadth below the Acromion, so as to preserve a large Portion of the deltoid Muscle. This Method will not only fill up the Cavity of the Wound at the Shoulder, so as to render it uniform and even, but will also much expedite the Cure.

The Manner
of Ampu-
tating.

VI. Every thing being thus far considered and advanced, you now take the Scalpel, *Tab. XIII. Fig. 1.* or *Tab. XII. Fig. 14.* and therewith make your Incision through the Integuments, and through the deltoid Muscle, as near within the Joint as we before directed. Which done, the Arm is then gently elevated, the better to discover and divide the Heads of the Biceps Muscle: And if, in performing this, you divide any considerable Arteries or Veins, which bleed so as to obscure your Work, they may be stopped for the present, either by Compressure with the naked Fingers of an Assistant, or by the Application of Lint and Compresses. But if the Hæmorrhage is profuse, and arises from a considerable Artery divided, as there frequently is a large Branch here, you must, in that Case, first secure it by Ligature, before you proceed farther in your Operation. The next Step is, to divide the Ligament of the Articulation first in its upper Part, and then on each Side, but very cautiously; moving the Head of the Humerus at the same time with your left Hand, that you may only divide the investing Ligament of the Articulation without injuring the Artery. Thus you may be sensible whether the Arteries are well secured: But even afterwards you must be very cautious not to wound the Artery, in dividing the rest of the muscular Flesh beneath the Articulation. Lastly, you must divide the Skin from the Arm near the Axilla, to leave a triangular Piece, with its Corner outermost, and its Basis next the Body, so as to be afterwards brought up over the Wound: And thus your Amputation is completed.

What must
be done af-
ter the Am-
putation.

VII. The Arm being totally removed in the Manner now described, you must next search for the Artery you before secured by Ligature, together with a Portion of the Flesh; and having discovered it, you now make another Ligature above the former upon the Vessel only, by a small crooked Needle, *Tab. VI. Fig. 5.* with strong Thread: After which you remove the first Ligature from the Flesh and Vessel, to prevent it from exciting an Inflammation.

Dressings
and Deliga-
tion.

VIII. You come now to the Dressings of the Stump: Which must be made with a Pledgit of Lint, with small Linen Compresses upon the Ends of the divided Arteries you before secured by Ligature. The lower Part of the Skin is then drawn upward, and the upper Part is drawn down together with a Piece of the deltoid Muscle. Though, in my Opinion, it would be better to apply no Pledgit or Compresses to the Arteries or Bone, before you have thus filled the Sinus of the Wound with the adjacent muscular Flesh, and brought the Skin well over: And then you may apply your Pledgit of Lint and Compresses; by which

which means the Flesh will more readily unite, and the Wound heal sooner than if you interposed Lint and Compresses. In the next Place, a large Quantity of Lint must be secured on the Wound by a sticking Plaster, cut in the Shape of a *Malta* Cross: Over which Plaster you impose a large and thick square Compress, with a cylindric Compress in the Axilla, to resist against the Ends of the Arteries, that they may be better able to endure the Impetus of the Blood in their Pulse. All these are to be again retained by a large double Compress in the Form of a *Malta* Cross; and that again invested by two other Compresses a little more than a Foot long, and four Fingers Breadth. The first of these is applied obliquely over the Stump, so as to let one End come over to the sound Shoulder, and the other End pass behind to the sound Axilla, or about a Hand's Breadth lower: The other and longer Compress must be imposed, so as to cross the former in opposite Directions, and to have its Ends cross each other upon the sound Shoulder. Lastly, your Deligation must be completed with the Bandage termed *Spica descendens*, as we shall direct in the last Part of our Surgery. But, in making this Bandage, you must fix a thick Compress, or a small Pillow, in the Axilla, that the Bandage may sit the neater, and not compress the Veins too much which are there seated.

IX. The abovementioned Operation, as here described, was performed on a *French* Nobleman for a *Spina Ventosa*, in the upper Head of the *Humerus*, by LE DRAN the Elder, with the Consent and Presence of the most expert Surgeons in *Paris*, as M. MARESCAL, ARNEAU, PETIT, MERY, &c. And this he did with Success, the Patient being perfectly cured, as we are told by LE DRAN his Son, and M. GARENGEOT. But the last of these Authors tells us, in a second Edition of his Operations in Surgery, that the said Nobleman died within six Months afterwards of a Plethora^a. M. GARENGEOT also directs this Operation to be performed for an Abscess in the Articulation. But whether it would be prudent to perform so dangerous and difficult an Operation, for a simple Abscess there, I leave to the Judgment of every experienced Surgeon.

An Example
of this Me-
thod of Am-
putating.

A Method of Amputation not much unlike this, which I recommended in the Arm, after an extraordinary Burn, *A. D.* 1739, you have here as follows: A poor Woman in a neighbouring Town, as she sat alone at Home, being seized with a Fit, fell into the Fire; by which Accident her Right Arm was burnt to the Bone, from the Hand quite up to the Shoulder, (see *Plate XXXIX. Fig. A and B.*) There was no Way of preserving the poor Woman's Life, but by taking off the Arm. But as the Tourniquet could not be applied without giving her excessive Pain, (the Skin being burnt to the Neck and Breast, and for other Reasons) I thought it more prudent to take the following Method. I ordered a large Needle, with a Thread of a proper Size, to be passed under the Head of the *Os Humeri*, where the brachial Artery descends, through the little Flesh that remained near the Bone. A Ligature was then made with the Thread on the Artery and the remaining Flesh; then the Flesh was cut with the Scalpel under the Ligature, and the Bones afterwards sawed off in the usual Manner. This was done in the Presence and under the Direction of my Son, without the Help of the Tourniquet: And with such Success, that the Wound, after the Amputation, bled but little (which is uncommon in these

^a In his *Operat. Chirurg.* Tom. III. near the End.

Cases and healed to our Wish, the Woman being still alive and in Health. Which singular Case was published by my Son the same Year; and this Practice there recommended in many other Cases, particularly in stopping Hæmorrhages of the brachial and crural Arteries: As may be seen more at large in his Treatise on the new Method of Amputating the Arm.

An EXPLANATION of the FOURTEENTH PLATE.

- Fig. 1.* Shews the Manner in which the Patient, Surgeon, and Assistants are to be placed for amputating the Hand, or Arm. A denotes the Patient, B the Surgeon amputating with the Saw; C the Assistant extending the Hand, D another Assistant holding the Arm; E the Assistant who holds the Patient's Body, and takes Care of the Tourniquet; F denotes the Dish or Vessel placed underneath to receive the Blood.
- Fig. 2.* Represents the Position of the Patient, Surgeon, and his Assistants amputating the Leg. A denotes the Patient seated in a Chair; B the Surgeon; C the Assistant who holds the Foot below the Calf; D the Assistant who holds the Leg above the Knee: E a Vessel placed on the Floor, to catch what little Blood may be spilt in the Operation.
- Fig. 3.* Denotes the most convenient Part for amputating the Leg at A, and the Thigh at B. But when the Disorder has extended itself higher up in the Thigh, it must be amputated proportionably above this Mark, though the Operation is then so much the more dangerous.
- Fig. 4.* Represents the Thigh A, with the Leg amputated B, in which may be seen the Part for fixing the Tourniquet C D, for amputating the Foot in the Tarsus or Metatarsus. The Tourniquet thus applied may also serve for amputating the Leg or Thigh, though not so conveniently as when placed higher up. In this Figure you have also a View of the divided Artery extended a little by the Pliers E, and going to be tied to the Ligature and Knot F. There are some indeed who do not approve of this Manner of tying the Ligature: But I have often experienced that it thus answers very well^a.
- Fig. 5.* Describes the Manner of amputating the Leg, so as to preserve the Calf. The Line A B denotes the first Incision to be made by the Scalpel, *Tab. XIII. Fig. 1. or Fig. 3.* The Line B C is the Course of the second Incision, by which the Flesh of the Calf is separated from the Bones of the Leg. C D the Place, where the Bones and rest of the Leg are amputated. Some reverse this Course of Incision, and first perforate the Calf with a double-edged Scalpel, *Tab. XIII. Fig. 3.* in Line C, and then they direct the Knife in the Course B A. But the first Method is, in my Opinion, most eligible.
- Fig. 6.* Represents the Manner of reflecting back the Calf of the Leg towards the Ham, after it has been separated from the Bones of the Leg by Incision: which done, the Surgeon next incises the Integuments, Flesh, and Periosteum in the Line B, and then saws off the Bones there.
- Fig. 7.* Denotes a Leg just amputated with the Calf A depending, to see the Ends of the two Bones: B the Tibia, and C the Fibula.

^a GARENGEOT finds Fault with this Method, *De Instrument. Chirurg.* Tom. II. p. 219. But LA MOTTE, another of our most eminent modern Surgeons, very much approves of it.



Fig. 8. Shews the Leg thus amputated, with the Calf A brought over and joined to the Stump B: C denotes Part of the Thigh.

Fig. 9. Represents the Method of applying the Screw Tourniquet (*Tab. V. Fig. 6. or Tab. VI. Fig. 1.*) above the Knee; A denotes the Leg; B the Thigh; CC the Press of the Tourniquet with its subjacent Pillow; D the Place where the leathern or filken Strap E E is fastened by Studs on one Side, and by the Hooks F on the other Side; G the Screw, by turning which the subjacent Artery is compressed in the Ham.

Fig. 10. Is a large crooked Needle for making a Ligature on the brachial Artery before the Arm is amputated in its Articulation with the Scapula, though the same may be also performed by the strait Needle, *Tab. XVIII.* either of which Needles will also serve for making Setons in the Neck.

PART II. SECT. II.

Of OPERATIONS belonging to the HEAD.

CHAP. XXXVIII.

Of making ISSUES upon the CORONAL SUTURE.

I. **I**SSUES are sometimes made in the Scalp of the Head upon the Meeting Their Uses. of the coronal with the sagittal Suture: But this Operation is not so frequent in *Germany*, as in *Italy* and *Holland*. Some Physicians think Issues in this Part can be of little or no Service, being not able to discharge any Humours from the internal Parts of the Head: And others again assert them to be of very great Efficacy, for the Truth of which they appeal to daily Experience. So that if we may confide in Experience, and the Authorities of able Physicians, we must readily acknowledge that Issues, made in this Part of the Head, may be highly serviceable in Vertigo's, obstinate Head-achs, Apoplexies^a, Epilepsies^b, Amaurosis^c, Stupidity, or Forgetfulness^d, with many other Disorders of the Head, and particularly of the Eyes and Ears, Defluxions, or Catarrhs.

II. To ascertain the proper Place of the Scalp for making these Issues, the The proper Seat of these Issues. antient Physicians^e direct to shave the Head, and then to measure with two Threads, one extending from the Nose to the Neck, and the other across the first to each Ear: By which means the Point where the Threads touch, or cross each other, will denote the Place where the Coronal and sagittal Suture meet; and is therefore the fittest Place for making your Issue, as you may see in the Figures of SCULTETUS, *Tab. XXVI.* MEEKREN, *Obs. Cap. V.* and DECKERS,

^a SCULTETUS, *Obs.* 34.

^b See a remarkable Instance in MEEKREN, *Obs. Chir. Ch. V.*

^c See DECKER's excellent Method in the Amaurosis and Epilepsy. *Exercit. Pract.* p. 109.

^d SLEVOGLIUS Dissert. of an Issue in the coronal Suture, as a Cure for a decayed Memory.

^e See CELSUS, *Lib. VII. Cap. 7. N. 15.*

Exercitatio.

Exercitat. Pract. pag. 110. But after all, it must be owned, that this Method of assigning the Place, or Meeting of the Sutures, cannot be certainly relied upon, because of the great Variation there is in this Respect in different People. Nor is it of any Consequence whether your Issue be made exactly over the Meeting of the Sutures or not; since the Matter discharged by it in both Cases, comes rather from the external Integuments of the Cranium, than through the Sutures from the Brain, as the Antients falsely imagined. It was also a Notion equally wrong, that the Antients entertained of this Part of the Cranium being thinner, and more perspirable, than the rest. Though it must be confessed, that Infants, whose Bones are not completely ossified, have this Part soft and membranous, which is usually termed in them, the *Fontanel*, or open Mold: Yet in Adults, this upper Part of the Cranium is almost constantly ossified like the rest of the Skull, and frequently the Bones are even harder or thicker here than in other Parts. But these we find were the groundless Reasons, which induced the Antients to make their Issues upon the Meeting of the Sutures. But if the Surgeon will be scrupulously exact in this Respect, he may pretty certainly discover the Meeting of the Sutures, without the forementioned *Apparatus*, of measuring by Threads, if he well considers the Course of them in dry Skulls, and feels carefully with his Finger upon the Scalp and Pericranium. For in most Patients the Meeting of the Sutures is sensible to the Touch, either by a small Cavity or Protuberance; upon either of which you may venture to make your Issue.

The Methods of making Issues in the Scalp.

III. To render Issues in this Part more efficacious, they are usually made by the actual Cautery. In order to which the upper Part of the Scalp is first to be shaved, and then the red-hot Iron is to be strongly pressed by your Hand, so as to burn through the Integuments upon the Part assigned, till you come to the Bones, or naked Cranium. The cauterizing Iron for this Operation may be of two Kinds: The first of which is without a Case, as we have given you a Figure of it in *Tab. III. Fig. 9.* taken from MEEKREN and DECKERS; the other, taken from AQUAPENDENS and SCULTETUS, is furnished with a Steel Case, or directing Tube, as we have represented it in *Tab. XV. Fig. 1 and 2.* But that the Force of the Cautery may not be extinguished by the Integuments before it has reached the Cranium, it may be convenient for the Surgeon, first to make an Incision either longitudinal^a or cruciform through the Skin, and opening the Lips of the Wound, insert the Tube at *Fig. 2.* that, by pressing the Cautery, *Fig. 1.* through it, you may at the first Time burn into the very Bone^b. But in whatever manner you make the Issue in this Part, it must be immediately dressed afterwards with a Pea dipt in some digestive Ointment, to be retained by a square Plaster and the four-headed Bandage, applied as we shall direct in treating of Bandages. For the rest, you may consult what has been before said of Issues in general at *Chap. XIX.* preceding. In order to credit the good Effects which many able Physicians affirm they have experienced from this Sort of Remedy, in many obstinate Disorders of the Head, it must be considered, that though there is no immediate Discharge hereby made of pernicious Humours from the Brain, yet the Cauterization makes so strong a Revulsion,

^a See CELSUS, *Lib. VII. Cap. 7. N. 15.*

^b Thus MEEKREN, in his Figure, expresses an Incision before the Application of the Cautery; but says nothing of it in the Description.

and the Pain it excites gives so strong a Stimulus to the Vessels, as frequently to remove Obstructions, and the inveterate Pains they have occasioned, even in one Instant. For more concerning the Uses of Issues in this Part, the Reader may consult, besides the forementioned Authors, MARC. DONATUS, *Lib. II. Hist. Miral. Cap. 4.* M. A. SEVERINUS, *Pyrotech. Chirurg. Lib. II. Part I. Cap. 6.* RIVERIUS *Cent. II. Obs. 93.* AQUAPENDENS, *Oper. Chirurg. Cap. 1.* CLAUDINI *Respons. de Cauterio in Sutura Coronali, &c.*

CHAP. XXXIX.

Of ARTERIOTOMY in the TEMPLES.

I. **A** RTERIOTOMY, as the Word imports, is the Apertion of an Ar- Arteriotomy
described.
tery with a sharp Instrument, in order to extract a proper Quantity of Blood, for the Recovery of a Patient; performed almost in the same Manner as bleeding in a Vein. Though this Operation is not so often performed at present with us, as it was formerly among the antient Surgeons, for fear of the profuse Bleeding, or an Aneurism, which may be occasioned by wounding this Vessel; yet, if it be well adapted to the Patient's Disorder, and skilfully performed, it may be very often of the greatest Service, and yet not attended with any bad Consequences. We read of the Apertion of Arteries made by the antient Physicians in various Parts of the Body; as in the Forehead, Temples, behind the Ears, in the Occiput, betwixt the Thumb and Fore-finger, &c. where-ever the smaller Arteries lie fair for Incision, so that their Pulsation may be perceived by the Finger through the Skin. But among the modern Physicians and Surgeons we hardly ever meet with this Operation performed in any other Parts but the Temporal Arteries, which may be opened by the Lancet without much Difficulty or Danger, as they lie very near the Skin, so as generally to be very perceptible to the Touch; and, being resisted by the *Os frontis*, on which they are incumbent, they may be very easily compressed, to prevent any profuse Hæmorrhage, or dangerous Aneurism. But even here every prudent Surgeon must own, it is much more difficult to make a fair Apertion of an Artery, than of a Vein; because they seldom appear visible through the Skin, and then you have no other Guide but their Vibration on the Finger. We shall not here enlarge upon the extraordinary Artifices which we read to have been used for Arteriotomy by the antient Surgeons, because they are now obsolete. We shall, in this Place therefore, only describe the Operation with its Dressings and Uses, as they at present obtain among our modern Surgeons and Physicians.

II. First, the Patient must be seated conveniently with his Head inclined to either Side against the Light, that the Surgeon may the better discover the Artery, in order to which he had best place the two foremost Fingers of his left Hand upon the Artery, at a little Distance from each other, as he will be directed by its Pulsation; and observing well the Course or Direction of it within that Space, to dip the End of the Lancet carefully into it betwixt his two Fingers. But it will be here necessary to incise deeper, as the Vessel lies lower, than in Phlebotomy. You must also enlarge your Incision more, by elevating The Method
of Opera-
ting.
the

the Point of your Lancet as you draw it out: Nor need you be afraid of cutting the Artery quite in two; for it will not be attended with any bad Consequences after Compressure and Deligation. If now the Blood follows your Lancet in a very florid and salient Stream, starting at every Pulsation of the Vessel, you may be satisfied the Artery is well opened: Otherwise you must repeat your Incision, till your Lancet has either divided or opened the Artery, which you may know by the forementioned Signs. But as the small and thin Point of the ordinary Lancet may be easily broke off against the Bone, I have experienced the Scalpel, *Tab. I Fig. G.* to be more convenient; especially if your Incision be downward and not upward. But to do the Patient any considerable Service by this Evacuation, you should bleed him plentifully; that is, to take about a Pound of Blood, or a Pound and half, or more, if he be plethoric, otherwise your Operation will be of little or no Benefit. Therefore we need the less wonder at the Practice of the Antients, whose Method was to bleed the Patient in this Manner till he fainted. If you are desirous of opening an Artery in the Occiput, or behind the Ears, rather than in the Temples, your Operation may then be conducted in the Manner we have now described.

Deligation.

III. When a sufficient Quantity of Blood has been taken, your Deligation must be made with three square Compresses, each larger than the other; laying on the smallest first, in which must be included a Farthing, a bit of Lead, or a Pellet of chewed Paper, to compress the wounded Artery against the subjacent Bone. Your other two Compresses being laid over the smallest according to their Size, they must be there firmly retained and secured by the *Fascia nodosa*, which we shall describe at large when we come to treat of Bandages at the latter End of our Surgery. The Head thus properly invested with your Bandage, must continue so at least a Week or eight Days before you take it off, to prevent a profuse Bleeding, or an Aneurism: And if the Deligation should, within that Time, get too loose, it must be tightened again, and continued till the Cure is completed.

The Uses of
Arteriotomy.

IV. The Uses of Arteriotomy are so many and considerable, that not a few Physicians recommend it as the last Refuge in many Diseases of the Eyes, and the most obstinate Disorders in the Head, from whence the Patient will often find Relief when all other Means have been tried in vain; especially when they are caused by too great a Fulness of Blood. Experience can best testify the good Effects of Arteriotomy in Vertigos, obstinate Head-achs^a, Epilepsies, Suffusions, and Inflammations of the Eyes, and most of the other plethoric Symptoms which attack these Parts. But particularly in Apoplexies, it has been lately demonstrated, in a professed Treatise on the Subject^b, to be the most effectual and expeditious Method of relieving the Patient. I shall therefore leave the prudent Reader either to countenance or condemn the Opinion of those who think *Ar-*

^a LANZONUS confirms the good Effects of Arteriotomy in obstinate Head-achs, Madness, Epilepsies and Diseases of the Eyes, *Ephem. Nat. Cur. Cent. III. p. 147*. It is also approved by BARBETTE, and much extolled by SEVERINUS, particularly in the Epilepsy. In a most obstinate Cephalæa I have found it effectual.

^b By CATHERWOOD, entitled, *A new Method of curing Apoplexies*; notwithstanding which, the Operation has been twice performed by me on two apoplectic Patients, the one an old and the other a young Man, but without the expected Success; for they both died soon after, though the Operation was made in the Beginning of the Disorder, and assisted with other proper Remedies; from whence we see, that *Arteriotomy* will not always cure Apoplexies.

teriotomy too dangerous to be put in Practice, and even then of no more Use than Venesection: Since the Uses and Effects of it are attested by the Observations and Experience of our best Physicians, and the Danger of it may be totally removed by proper Compresses and Deligation; yet, I must own, that, with regard to the Reputation and Character of a young Physician or Surgeon, it may be generally adviseable to defer this for the last Help, in Cases which will admit of Delay. After all, it will be equally necessary to assist this, as well as many other Operations in Surgery, by ordering a proper Diet, Regimen, and Medicines adapted to the Patient's Disorder, if we expect to make any considerable Cure.

C H A P. XL.

Of the HYDROCEPHALUS.

I. **H**YDROCEPHALUS is a preternatural Distention of the Patient's Head to an uncommon Size by a Stagnation and Extravasation of the Lymph: Which, when collected within-side the Bones of the Cranium, the *Hydrocephalus* is then termed *internal*; as it is *external*, when retained betwixt the common Integuments and the Cranium. The first Kind of the Disorder is seldom to be met with but in Infants, who contract it whilst they are in the Womb, or in a difficult Birth. Among others, the Reader may consult, on this Head, WEDELIUS, *De Morb. Infant.* pag. 47. and RUYSCH, in *Thesaur. Anat.* II. Tab. III. which last has given a very ample Account of this Disorder. It generally appears in the Infant whilst young and new-born: But if it has advanced to any great Degree, it is a dangerous Case, and generally incurable. For if you make a Paracentesis in the Head, to discharge the Lymph, your Operation is no sooner performed, but the Infant dies, as Physicians have been too often well assured by Experience. If the Disorder be in its first Stage, and but beginning to shew itself, it will be most adviseable to try what may be done by Medicines; such as gentle and repeated Purges, to draw the Humours downward with corroborating Medicines internally. Externally you may apply to a good Purpose a large Compress round the Head, dipt in warm *Aq. Calcis* & *Sp. Lavend.* vel *Aq. Reg. Hungar.* This Compress must be retained by a proper Bandage, termed the *Reflex Capeline*, which is described in the *Third Part* of our System treating on Bandages.

The internal
Hydroce-
phalus.

II. In the external *Hydrocephalus*, as we observed, the Humours are lodged betwixt the external Integuments and the Cranium. Hence you may distinguish this Species by the Softness of the Head and Skin externally. But in the internal *Hydrocephalus* the Head feels as hard as usual, though it is much more distended and enlarged: The Reason of which Appearances is manifest from what we said in the last Paragraph. Though the external *Hydrocephalus* is not without Danger, yet it may be much more readily cured than the internal Species; but the more difficultly as it is of a longer standing. The Cure must be attempted as well by internal as external Remedies at the same Time. Apply Cathartics, Diaphoretics, Diuretics, attenuating and strengthening Medicines for internal Use: And externally, a Compress dipt in the Fomentation beforementioned for the internal *Hydrocephalus*. Or, you may apply those Waters and

The exter-
nal Hydro-
cephalus,

Spirits to the Head, together with discutient Caps or Bags filled with the Tops of dry *Majorana*, *Origanum*, *Serpillum*, *Pulegium*, *Chamomilla*, *Salvia*, *Rorismarina*, *Lavendula*, &c. warming them before you secure them on the Head by the proper Bandage. HILDANUS writes, that he happily cured an *Hydrocephalus* barely with the repeated Application of *Aqua Calcis* as a Fomentation by means of a Sponge. To the forementioned Remedies we may add an Errhine, or cephalic Snuff, composed *ex summit. Marjoranæ, Lil. convul. Mari veri, Hippocastan, Nicotiana, &c.* Add to these the repeated Chewing of Tobacco in the Mouth, to discharge the Serosities from the Head by Spitting. Lastly, some foment the Head with the Fumes of burning Spirit of Wine highly rectified. But if all these Means prove unsuccessful, Recourse must then be had to surgical Helps: Among which, you ought, first, to try a large Blister, applied behind the Ears, on the Occiput and Neck. If this does not altogether answer your Intention, you may add Scarification and Cupping upon the same Parts. PISO relates, that he cured a Man of an *Hydrocephalus*, by making Issues in the Neck: And therefore Setons, one of which will effect as much as two Issues, may be here also highly serviceable. When all other Means have been used in vain, some of the Antients advise a deep transverse Incision to be made at the Bottom of the Head or Occiput: Which I cannot approve of, as it may easily wound, or even totally divide, the Blood-vessels and Muscles there seated. But as this Danger may be avoided by deep Scarification and Cupping upon the same Parts, the Discharge that way may be equally serviceable, and much more commodious. The Parts scarified are to be afterwards dressed with Lint, spread with some digestive Ointment: adding sometimes a little *Præcipitatum rubrum*, to keep up the Discharge. When the Disorder is thus removed, you heal it up with some vulnerary Balsam, keeping the Patient, for a considerable Time, in a Course of proper internal Medicines, and under a suitable Diet and Regimen. Histories of this Disorder are given in PAREY, LUSITANUS, KERKRINGIUS, and others. But particularly VESALIUS relates, that he found nine Pounds of Serum in the Verticles of the Brain, in a Subject who died with an *Hydrocephalus*, *Anat. Lib. I. Cap. 5.*

C H A P. XLI.

Of TREPANNING the CRANIUM.

When the
Trepán is
necessary.

I. **T**REPANNING is universally understood to be a Perforation, or Opening made in the Bones of the Cranium by a kind of *Terebra*, or round Saw, which has its Name from the *Greek* Word *τρέω*, and by the *Latins* called *Modiolus*. This Operation was performed by the Antients, not only in Fractures and Depressions of the Cranium, but also in those other obstinate Disorders of the Head and Brain, which could not be relieved by internal Medicines, and the Use of Issues upon the coronal Suture: By which means they thought to give a more immediate Vent to the offending Humours. But the modern Surgeons never use the Trepán at present for internal Disorders of the Head;

Head^a; though they seldom neglect it in Fractures and Depressions of the Cranium, caused by Blows, Falls, Bullets, and other external Injuries. They also frequently apply it in Fractures and Fissures of the Cranium, to discharge extravasated Humours, which, by injuring the Brain, might occasion the Death of the Patient. The Trepan is therefore useful, not only in these Cases, to elevate the depressed Parts of a fractured Bone in the Cranium, for which you may consult *Part I. Book I. Chap. XIV.* but also the most fatal Symptoms, and Death itself are avoided, by discharging the extravasated Blood through an Aperture made by this Instrument. It is well known, that the Bones of the Cranium are often fissured, and the adjacent Blood-vessels, lacerated by external Injuries, without any apparent Fracture or Depressure of them; so that if the extravasated Blood be not removed by the Trepan, by pressing on the Brain it will greatly injure, if not totally destroy its several Functions. The Consequences of neglecting this Instrument in such Cases will be Restlessness, Delirium, Convulsions, Vertigo, Apoplexies, Stupidity, with a Loss of the Senses, Speech, and voluntary Motion, and at last Death itself. Sometimes only the milder of these Symptoms appear, and in but small Degree, when the Head has been injured by external Violence: But in some time afterwards, when the Blood or Humours have been accumulated, the most fatal Symptoms do then gradually approach, and even threaten the Life of the Patient. But if Death is not the immediate Consequence, as there is no natural Vent for the extravasated Blood or Lymph, it must consequently putrify, and, by corroding the Brain and its Membranes, will inevitably destroy the Patient in a little Time, if it be not prevented by a judicious Application of the Trepan, for discharging the offending Matter. This Instrument therefore ought never to be neglected in urgent Cases of this Nature.

II. The less Time you lose, the better, before the Application of the Trepan: But in the Operation itself you must go on slowly and carefully. For it is extremely difficult, if not impossible, for you to take out a Piece of the Cranium by this Instrument, without injuring the subjacent *Dura Mater*, to which it is most intimately attached, so as to be often in some Degree wounded, though you use the greatest Circumspection. For this Reason I am induced to condemn the Advice of those^b, as very unsafe, who direct to trepan the Cranium immediately upon every slight Disorder of it. I should therefore advise you, with CELSUS, and most of the Moderns^c, to try first the Use of other Remedies, both external and internal, as Phlebotomy, Purging, Clysters, discutient Bags, &c. rather than immediately to subject the Patient to the Trepan, before you are convinced it is absolutely necessary^d. But you may see more upon this Head in *Part I. Book I. Chap. XIV. Sect. XXXVI, & seq.* where we treat of Wounds in the Head. On the other hand, there are many Cases, in which

The Trepan
not to be
used hastily.

^a Though indeed there is an Instance related in the *Mem. Acad. Paris. Chirurg.* where an obstinate Head-ach was cured by Trepanning, *Tom. I. p. 226.* But there follows another, *p. 227.* where the Operation failed in a similar Case.

^b See FIENUS *De Trepanatione*, and BOHNIUS *De Trepanationis Difficultatibus*. Likewise ROONHUYNS, *Obs. I. p. I.*

^c Among which are CÆSAR MAGATUS, *Lib. II. De Vulneribus, Cap. 41.* and DIONIS in *Chirurg. Operat.*—CELSUS, *Lib. VIII. Cap. 4.*

^d See some excellent Observations on the Use of the Trepan in dangerous Cases, *Mem. Acad. Chirurg. Gallic. Tom. I. p. 188.*

Delay may be of the most fatal Consequences ; where, being convinced of the Insufficiency of other Remedies, you ought immediately to have Recourse to the Trepan, in order to elevate or remove the depressed or fractured Parts of the Cranium, and to discharge the Humours extravasated internally.

The Event
of the Ope-
ration
doubtful.

III. The Surgeon can hardly ever be certain of the Success of this Operation : Because he cannot be previously assured in what Manner or Degree the Brain, and its including Membranes, are injured, the Disorder generally turning out worse than its Symptoms indicated. Therefore we need the less wonder that most Patients miscarry after the Use of the Trepan, not from the Operation, but the Violence of their Disorder, or the Injury received. And some there are, who, being much better after the Operation, appear seemingly in a fair Way for Recovery, and yet miscarry beyond all Expectation. Upon Enquiry made after the Causes of this unexpected Disappointment, and sudden Death of the Patient, they appear chiefly to be two: Either from, 1. an Inflammation or Suppuration of the Brain and its Membranes, from the Putrefaction of some Blood or Matter that could not be discovered or discharged ; or, 2. from some Insult of the Blood on the Parts affected, by Irregularities committed by the Patient in the Non-naturals, either in Drinking, and bad Diet, (or by an unwholesome Air^a) or by Frights, Anger, Venery, or other intense Passions, &c.

What Parts
of the Cra-
nium may
be trepan-
ned, and
what not.

IV. But before we proceed to acquaint the young Surgeon with the Method of performing this Operation, it will be previously necessary to point out to him, upon which Part of the Cranium it may be convenient for him to apply the Trepan. And, in general, the Place where the Fissure appears, will be most convenient for the Trepan, if nothing contra-indicates. But, in Fractures, it will be proper to trepan a little below the injured Part, that the extravasated Humours may be more easily discharged : Yet, if the Fragments of the Bone can be removed, so as to make Way for the Extraction of the Blood and Splinters which injure the Brain, the Use of the Trepan may be in that Case neglected. It must be next observed, that there are several Places in the Cranium, which ought not to be in any Case trepanned : As, 1. upon the Sutures where the Bones meet with each other, especially upon the sagittal Suture, as HIPPOCRATES has long before observed ; because, in these Parts, the *Dura Mater* is more strongly attached to the Cranium, and under the sagittal Suture runs the longitudinal Sinus of the *Dura Mater*, which, by trepanning in this Place, might easily be injured, to the Hazard of the Patient's Life. Yet, in Cases of urgent Necessity, the Trepan may be used upon the coronal Suture, and sometimes upon others. Instances of which may be seen in CARPUS, *Lib. de Fraët. Cranii*, HILDANUS, *Obs. I. Cent. 2.* 2. It is equally dangerous to trepan the Cranium in the Middle of the *Os Frontis*, especially in that Part which forms the Fontanel : Because under these is seated the forementioned Sinus of the *Dura Mater*, which might easily be wounded by the Instrument. 3. The Trepan must not be applied upon any of the Sinuses of the *Os Frontis*. 4. Nor ought it to be used where any large Vein or Artery spreads itself. 5. If the fractured Part of the Bone, upon which you fix the Trepan, is loose or carious, you might then injure the Brain by this Instrument. 6. It has been judged improper to trepan

^a It has been observed by the *French* Physicians, that Trepanning has failed in many Hospitals, on account of the Impurity of the Air. *Mem. Acad. Chirurg.* Tom. I. GUILLEAM. also relates, that this Operation generally proved fatal in *Paris*, though successful in other Parts of *France*.

in the lower Parts or Basis of the Cranium, which are invested with Muscles, as about the Occiput and Temples: Though the Moderns find that the Trepan may be very well used, and even applied upon the lower Parts of the Cranium, and upon the temporal Bones, after the Muscles have been freed from them^a. 7. Lastly, it will be improper to trepan upon the cruciform Eminence of the Os *Occipitale*. Notwithstanding these Rules or Cautions, if a violent Fracture should happen in or near the forementioned Places, you ought to trepan as near to the affected Part as possible: And if the Fracture has passed a-cross the Sutures, you must trepan within a Finger's Breadth of the Suture on each Side. Sometimes it is impossible to discover the particular Part of that Cranium, which is injured; the Patient, in the mean time, being afflicted with the most urgent and dangerous Symptoms, such as Vomiting, Drowsiness, Convulsions, Fever, Bleeding at the Nose and Mouth, with the Loss of his Senses and Speech. In these Cases, it will be necessary to trepan first on the Right Side, then on the Left, afterwards upon the Forehead, and lastly, upon the Occiput, and so round till you meet with the Seat of the Disorder. For it is much better, in these desperate Cases, to try a doubtful Remedy, than none at all, as CÆLUS^b rightly advises, that the Surgeon may not be accused of having neglected any thing which might conduce to the Recovery of the Patient. You must not think it a new or uncommon Practice to make several Perforations in the Cranium after one another by the Trepan: For, in many Cases, we meet with extravasated Blood or Splinters of the Bone, which require the Use of the Trepan in other Parts, besides where the Wound itself manifestly appears. Therefore the Operation must be repeated, till you can discover and remove the Cause of the Disorder: So that it is no Wonder to meet with three or four, nay seven or twelve Perforations in the Cranium, made by the Trepan, in the same Patient. Of which we are furnished with many Instances, particularly in SCULTETUS, *Obs.* 7. GLANDORPIUS *Speculum Chirurg.* *Obs.* 3. p. 46. to which add DIONIS in his Operations, and many others. But what is more, we read of the Trepan being applied twenty-seven different Times with Success upon a Count of NASSAU, in STALPART. VANDER WIEL, *Cent.* 1. *Obs.* 8.

V. After having pitched upon the Part to be trepanned, your next Business is, to shave the Scalp, and make an Incision through the Integuments, to lay bare the Cranium, except it should have been already done to your Hand by the Wound. The Incision of the Integuments may be made in the Form of a Cross + , or in the Figure of the Letter X, V, or T, large enough to admit the Crown of the Trepan upon the Bone. After your Incision is thus made, you must elevate and separate the Integuments and Periostæum from the Cranium by the Edge and Handle of the Scalpel: And having wiped off the Blood, you must insert a large Quantity of scraped Lint, to dilate the Wound, and compress the divided Vessels, in order to diminish the Hæmorrhage, which indeed, though profuse, may, in many Patients, be serviceable. A Compress must be next applied, dipped in *Sp. Vin. Aq. Calc.* or *Sp. Vin. Camphorat. calid.* to be retained by the Kerchief Bandage. Thus the Patient is to be left, if the Dis-

Provision
for the Ope-
ration.

^a See ROUHALT *De vuln. Cap.* p. 91. & seq. and SAVIARD, *Obs.* 27. p. 136.

^b In *Lib.* II. *Cap.* 10. To which we may add the Sentence of HIPPOCRATES in *Aphor.* vi. Sect. 1. *Desperate Disorders require desperate Remedies.*

order will permit, for a few Hours, that the Blood may be stopped before you apply the Trepan: Otherwise the Work will be so much obscured, that you cannot see what you are about. Yet if any Delay will be dangerous, you ought to apply the Instrument immediately: Before which, if the Hæmorrhage be great, you may secure the Ends of the divided Arteries by Ligature with a crooked Needle and Thread. But if you are in great haste, the Hæmorrhage must be suppressed for the present by the Fingers of an Assistant pressed upon the Part.

Apparatus of
Instruments
and Dressings.

VI. We come now to the Apparatus of Instruments and Dressings, which must be provided before you enter upon the Operation. The first and principal is the Trepan or Terebra, with its Crown, *Tab. XV. Fig. 3.* Some of the Antients used a Trepan made in the Shape of a common Gimlet, according to the Figures of FABRICIUS AB AQUAPENDENTE, ANDREAS A CRUCE, and SCULTETUS (*in Officina Chirurg. pag. 14, & seq.*) *Tab. II. Fig. 7, &c.* which Instrument they applied with one Hand; from whence it was usually denominated the Hand-Trepan. But, as this Instrument labours under many Defects, which renders the Application of it less commodious, the Moderns, at present, use a Trepan like that presented in *Tab. XV. Fig. 3.* with a Handle turning round, like that used by Coopers, which is much more commodious than the antient one; especially if the Crown of it be not made cylindrical, but broader above than below, in the Shape of an inverted Cone, as it is represented in *Fig. 3. A.* By which means the Instrument, meeting with more Resistance as it descends further through the Bone, is not so liable to rush in upon and wound the Brain. The Instrument contrived in this Manner is, by some, termed the Trepan of HILDANUS, though it was known and described by CELSUS^b, and others of the Antients, long before HILDANUS. The Crown of this Instrument, marked A, is joined to the lower Part of the Handle B, by a Screw, so that it may be taken off and put on at Pleasure: Or else, that a Crown of another Size may be screwed in its Place, since it will be necessary for the Surgeon to be provided with Crowns of different Sizes. The Connection of the Crown, with its Handle, is, by some of our modern Surgeons, made in a different Manner from that here represented, but with no great Advantage, in my Opinion; since that of the Make here represented, is found to answer most Purposes conveniently enough. The Trepan is distinguished into Male and Female: In the first of which the Crown is furnished with a sharp Point or Pyramid A. But when the said Point or Pyramid, *Fig. 4.* is taken out by the Winch, *Fig. 5.* the Trepan is then termed Female. You must next be also provided with a Scalpel of a particular Make, with a round and flat Head, as represented at *Fig. 6.* which is, by some, denominated the lenticular Scalpel: To which add another Instrument for gradually depressing the *Dura Mater*, of the Shape represented at *Fig. 7.* You must be also provided with a perforating Instrument, *Fig. 8.* which must be screwed into the Cavity B of the Handle *Fig. 3.* Also a Hair Brush, like that represented at *Fig. 9.* with a smaller Terebra or Wimble, like that in *Tab. VII. Fig. 7.* a Lancet, an Elevator, *Tab. VII. Fig. 7, 8, and 14.* a Tooth-pick made of

^a See also AMB. PAREY, *Lib. IX. Cap. 18.* where he gives such a Figure of the Crown of this Instrument.

^b *Lib. VIII. Cap. 3.*

^c *Vid. GARENGEOT Tract. de Instrument. Tom. I. pag. 115.*

a Quill, a Probe with a sharp Point, some Dossils of Lint: And, lastly, a Vessel with some *Spirit. Vin. rect.* all which are to be placed in order in a large Dish or Plate, that they may be ready to the Surgeon's Hand in performing his Operation. The Apparatus of Dressings and Bandage to be applied after the Operation, consists of a Dossil of Lint of an orbicular Figure, which must be tied round the Middle with a Piece of Thread, about a Span long, the Form of which is represented in *Tab. XV. Fig. 11.* Besides which, there must be added another round Bundle of Lint of a convenient Size, secured by a Thread like the preceding, as presented at *Fig. 12.* You must also have some Pledgits of Lint, *Fig. 13.* for recovering the other Dressings, and filling up the Cavity in the Cranium. To these add some *Mel. Rosar. & Tinct. Succin. vel Mastich.* some scraped Lint, a square Compress: And lastly, a large Napkin, or square Piece of Linen, to make the Kerchief or Bandage for the Head. All which Particulars are to be disposed in order upon one or two large Plates, that they may be readily found, and handed to the Surgeon as he wants them.

VII. The Aparatus being thus provided, we come next to the Operation itself. To perform it with a greater Readiness and Exactness, the Patient must be disposed in a convenient Posture upon a Couch, or some other low Seat, in such a Manner, that the Surgeon and Assistants may have free Access to perform each their Part. This done, and the Dressings removed, the Wound is next to be cleansed from the extravasated Blood, or other Foulness: After which, you place the Head in a convenient Manner upon a Pillow, to be held fast by an Assistant. The Surgeon now takes the perforating Trepan, *Fig. 8.* which he adapts to the Handle B, instead of the Crown A, *Fig. 3.* so that by turning round the Handle D, he makes a small Entrance or Aperture with his Instrument, and then applies the Male Trepan with a Crown, *Fig. 3. A.* Upon the Top of the Handle CC, the Surgeon fixes his left Hand, upon which he places his Chin or Forehead^a, while with his Right Hand he slowly and carefully turns round the Handle, till the Crown of the Trepan, with its Spindle, have made a circular Entrance deep enough in the Cranium. Then he removes the Spindle, and continues his Work carefully with the Crown of the Trepan only, as long as he sees convenient, all the Saw-dust being first brushed off from the Cranium and the Teeth of his Instrument with Brushes of Hog's Bristles. He now continues to use the Trepan till the Saw-dust becomes bloody, which denotes, that he has penetrated the Diploë, or intervening spongy Part of the Cranium. But it is to be observed, that he will not always meet with this Sign, because in some Sculls the Diploë is wanting in the Part trepanned. However, when his Saw-dust becomes bloody, the Instrument must be directly laid aside, and, after washing away the Blood with a Sponge dipt in *Sp. Vin.* he then screws the small Terebra, *Tab. VII. Fig. 7. B,* by two or three Turns, into the small Aperture in the Middle of the trepanned Piece of Bone, and then takes it out again, making two or three more Turns with the Crown of his Trepan.

The Method of Trepanning.

^a Most Surgeons formerly placed their Forehead upon their left Hand, on the Instrument; but it seems to be a better Practice to lean the Chin as M. PETIT and GARENGEOT direct; because then the Operator has a better View of his Work.

Then he examines with a Probe or Tooth-pick, whether the Plates of the Cranium are sufficiently sawed through; which cannot be better known, than by carefully attending to the Colour of the circular Groove or Division: For when that appears of a blue or grey Colour, which was before white, it is a Sign, that you have penetrated so far through the lower Plate of the Bone, as to render the *Dura Mater* almost conspicuous through it. The Trepan must therefore now be applied with greater Circumspection, lest the Saw-Teeth of its Crown should rush in upon and wound the *Dura Mater*, which might be attended with violent Inflammation and the most malignant Symptoms. But if the bony Plate appears livid in one Part of the circular Groove, and white in another, it is a Sign that the Trepan has not cut equally through; and therefore it must be inclined and pressed a little harder upon the whitest Parts, moving round the Handle slowly and carefully, till the Saw-Teeth of the Crown have cut deep enough to make the round Piece of Bone loose or moveable. In that Case it will not be convenient to cut totally through the Bone with the Saw-Teeth of the Trepan. To avoid wounding the subjacent *Dura Mater*, you should rather screw in the Terebra again, *Tab. VII. Fig. 7. B.* or some such Instrument, till you find that by pulling this upward with the Assistance of an Elevator, you can totally remove the round Piece of Bone.

The Treatment after Trepanning.

VIII. Having thus extracted the round Piece of the Cranium, the Blood usually follows it: Which being wiped off, the Surgeon is carefully to examine, whether there are any Fragments or rough Parts remaining to be extracted, or Depressions to be raised. If there are, you must do it immediately: If not, you must smooth the rough Parts about the lower Margin of the Aperture, by applying the headed Scalpel, *Fig. 6.* to prevent the *Dura Mater* from being pricked and injured by any of the sharp Splinters. This done, the Blood will more readily discharge itself: But to promote its Exit, you may gently incline the Patient's Head on one Side and another, tenderly and carefully pressing the *Dura Mater* itself, either by the Head of the Scalpel, *Fig. 6.* or the Depressor, *Fig. 7.* By which means the Patient is no sooner relieved from the Weight or Pressure of the extravasated Blood on his Brain, but he instantly begins to recover his lost Senses, either suddenly or by Degrees, like one just awoke out of a deep Sleep. When the Patient has thus recovered his Senses, and the Blood notwithstanding is in some measure retained, the Surgeon should direct him to fetch a deep Breath, and hold it with a Strain, like one that has a hard Stool. Others rather recommend violent Sneezing, provoked by Sternutatories, in order to force out the extravasated Blood: The Success of which, in my Opinion, must be very precarious, if not sometimes fatal.

When extravasated Blood, or a bony Fragment or Splinter are lodged under the *Dura Mater*.

IX. If the *Dura Mater* appears distended or elevated, and of a blackish blue Colour at the trepanned Aperture of the Cranium, it is usually a Sign that Blood or Matter are retained underneath it. Therefore there remains but one and a doubtful Remedy for it. Which is, to make a Perforation through the *Dura Mater* (as also the *Pia Mater* when the Matter lies so low) with a Lancet or Scalpel, to give Vent to the retained Blood or Matter, which will otherwise certainly prove fatal to the Patient, by eroding some of the larger Blood-vessels. I know there are some, who think the *Dura* and *Pia Mater* cannot be perforated without destroying the Patient, and therefore they forbid it.

it. But the Success of this Practice, if you avoid the larger Arteries and Veins, is confirmed, not only from my own Experience, but likewise the Authorities of ^aPAREY, ^bGLANDORP, ^cCOITER, ^dFALLOPIUS, ^eMAGATUS, ^fMARCHETTI, ^gROHAULT, ^hBLANCARD, and other creditable Writers, who testify, that many have had this Operation performed without Danger. If you meet with any bony Fragments or Splinters which irritate and wound the Brain, they must be carefully extracted, either by your Fingers or the Pliers: Or if any Parts of the Bone are depressed only, you must raise them by your Fingers, a Lever, or an Elevator adapted to the Purpose. When a Splinter is insinuated betwixt the *Dura Mater* and the *Cranium*, so that you cannot extract it by the first Aperture you made with the Trepan, a second or third Perforation must be made by the same Instrument, till you have removed every thing injurious to the Brain and its Meninges. Sometimes it will be necessary to cut off or remove the bony Fragments, by making a second Perforation into the first, like a half Moon, by the Trepan when the Fragments are strong, or by the small Saw (*Tab. VII. Fig. 9.*) by a Pair of cutting Forceps, or lastly, by the Mallet and Chissel, to be seen in the said *Tab. VII.* But, when the Fragments are thin and weak, you may remove them by the lenticular Scalpel, *Tab. XV. Fig. 6.* that you may afterwards extract or remove the vellicating Splinters. When there is a long Fissure in the *Cranium*, you may trepan upon each End of it: But when the Fissure runs in several Directions, you must trepan upon each, because every one of them has usually extravasated Blood or Matter lodged underneathⁱ.

X. Having described the Method of perforating the *Cranium* by the Trepan, and of discharging the extravasated Blood, Matter, and bony Fragments, we next proceed to the Dressings and Deligation. These are made, first, with a round Pledgit of dry Lint, *Fig. 11.* to be laid next the *Dura Mater*, with a Thread fastened to it, and hanging out of the Aperture, that it may be placed under and drawn out from beneath the *Cranium*: Upon which Pledgit of Lint is afterwards poured some *Mel. Rosar.* diluted with a little *Sp. Vini*; though there are some who recommend the Application of *Tinct. Mastich. Succin. &c.* which are, in my Opinion, too strong and acrid, because they often molest the Patient with violent Pain. You then lay on a like Pledgit of Lint, furnished with a String, as in *Fig. 12.* with other Dossils, till the Cavity is replete. In the next Place, the *Cranium* and Wound itself must be dressed with Lint, spread with some mild digestive Ointment, or *Mel. Rosar.* upon which add a square Compress dipt in warm *Sp. Vini*, or *Sp. Vini Camphorat. cum Aq. Calc.* and then you secure the whole, without a Plaster, by the Capeline or Head-Bandage, described in the End of our Surgery.

XI. In the subsequent Dressings, which must be repeated once or twice every Day, you must strictly avoid fat and oily Applications; which will destroy the Membranes and foul the Bones: Instead of such, you must apply balsamic and healing Topics,, especially *Mel. Rosar. cum pauco Sp. Vini, Tinct. Mastich. &c.*

^a Lib. ix. Cap. 21. ^b Obs. Chirurg. 4. ^c Obs. Anatom. & Chirurg. ^d De vuln. Capit. Cap. 48. ^e De vuln. Lib. ii. Cap. 42. ^f Obs. 14. ^g Pag. 83. 116. ^h Obs. Med. Phys. Cent. 1. Obs. 27. ⁱ The French Surgeons have described, and illustrated with Observations, a great Variety of Cases, where a frequent Repetition of the Trepan was requisite. *Mem. Acad. Reg. Chirurg. Tom. I. p. 252. & seq.*

The Wound being thus constantly dressed and attended, you will have an Exfoliation of a thin Plate from the trepanned Margin of the Bones, usually within forty or fifty Days, which ought not to be pulled away by Force. Your Exfoliation being obtained, there will then appear new Flesh and Callus, shooting up from the clean Bone and *Dura Mater*, so as at length to fill up the whole Cavity. By that Time you find the Cavity about half filled, you must moderately compress the sprouting Flesh and Callus by scraped Lint and Bandage, to prevent it from being too soft and lax: And when it is arrived even with the Surface of the Bones of the Cranium, you must endeavour to conjoin and extend the Integuments over it, by the Assistance of Sticking-Plasters; that the new-formed Substance may intimately unite with the superinduced Skin. This new-formed Substance, with which the Cavity in the Cranium is filled, becomes gradually more and more indurated: But so as even at last to resemble rather a Cartilage than a Bone, which, upon boiling the Cranium, separates, and falls out from the other Bones. And it is from the weaker Resistance of these cartilaginous Places that such as have been trepanned are subject to Disorders and Pains in their Heads, upon a Change made in the Weight and Temper of the Atmosphere: Though that Inconvenience may be partly remedied, by constantly keeping the Place armed with a Plate of Silver.

The Removal of Accidents.

XII. If a Vein should open itself so as to bleed profusely after the Operation has been performed with the Trepan, then you must sprinkle on some *Pulv. ex Bolo Armeno, Sang. Dracon. Thure & Colophon. &c.* compressing the Part for some time with Lint. But if the Brain or *Dura Mater* should be inflamed, you must apply discutient and cooling Topics externally, *Aq. Flor. Samb. cum pauc. Gutt. Sp. Nitri Dulc.* the Patient must also use Abstinence, with Phlebotomy, and cooling diluent Medicines internally. Even some (as ROCHAULT, p. 123.) recommend Scarification of the *Dura Mater* itself, before the last prescribed Mixture is applied. But, if a Suppuration should follow, so as exactly to form an Exulceration, the Surgeon must cleanse away the Matter, or Sordes, with scraped Lint, or by an Injection mixed with *Mel. Ros. Sp. Vini & Tinct. Mastich. Succin. vel Elix. prop. sine alcali vel acido.* If, after the Patient has been once trepanned, he perceives great Uneasiness and Disorder in some other Part of the Head, it is a Sign there still remains some foreign Body to be removed. Therefore the Trepan must be again applied upon the assigned Place. If any spongy Excrecence, or proud Flesh should rise up above the Level of the Wound upon the Cranium, it may be removed by some of the following Methods: Either by strong Depression with Lint dipt in *Sp. Vin. vel Tinct. Mastich.* and a tight Bandage, or by applying the round Piece of Lead, *Fig. 14.* contrived by BELLOSTE^a, and is, by some, made perforated, and furnished with Handles, as at *Fig. 15.* which is to be put into the Aperture of the Cranium, and well covered with round Pledgits of Lint: But you will seldom have Occasion for this Instrument, if the first Method be used. Or, lastly, if the Excrecence has already surmounted the Surface of the Cranium, it may be cut off, either by tying it round with a Thread, or with a Pair of Scissors, and the rest may be taken down with *Vitriol. Cærul. Pulv. Sabin vel Alum. ust.* and for the future you must make a stricter Compressure and Deligation with more com-

^a See his Treatise, entitled, *Le Chirurgien d'Hospital.*

pack Dossils of Lint. By which means the sprouting Excrecence will be not only compressed and reduced, but the Wound itself will readily heal in a little Time. We have an Account of the Trepan being repeated to the eighth Time for a Caries in the Cranium, *Mem. Chirurg.* Tom I. p. 262. There is another, of a successful Operation on the coronal Suture, and the Repetition of it, p. 255. But in p. 244. it is advised to omit it. LE DRAN also has many curious Observations on Trepanning. As to the Abuse of it, consult ROONHUYNS in his Observations.

C H A P. XLII.

Of Extracting Bodies fallen into the EYES.

I. **I**T is no uncommon Thing for the Eyes to be molested with a bit of Glass or Sand, a Splinter of Wood, or from off a Quill, or the Toe or Finger-Nails, and sometimes by little Insects, or caustic and pricking Bodies of various Kinds; which, by slipping into this tender Organ, we daily experience will produce excruciating Pain and Inflammation. To remove these, and prevent their bad Consequences, the Surgeon's Aid is often required: Whose chief Business is, to discharge the foreign Body as soon as possible, by some of the Means we shall hereafter prescribe.

Things to
be extracted
from the
Eyes.

II. The first and most easy Method of discharging these Substances, is, by agitating and extending the Eye-lid with one's Fingers, holding the Head down at the same time: By which means the increased Flux of Tears, excited by the vellicating Body, very often washes the same out of the Eye, without much Difficulty. But if this Method does not succeed, the next Remedy is, to blow some levigated Pearl or Crabs-claws through a Quill under the Eye-lid; that, as these are washed out by the Tears, they may also take away the foreign Body with them. Otherwise the Surgeon must take the small round Head of a slender Probe, or a little Pair of Pliers, the End of a Tooth-pick, &c. and extending the Eye-lids gently from the Eye, carefully search for, and tenderly extract the offending Body. There still remains a very easy and certain Method for removing these injurious Substances from the Eyes, by dipping a Pencil-brush of soft Feathers, or a bit of fine Sponge fastened in a Quill, in warm Water, by which you may brush them out from betwixt the Eye and its Lid. Lime, or any acrid Salt, and such like Substances, may be washed out by warm Water, or Milk, either by injecting them, or with a Feather or bit of Sponge. When the foreign Body is removed, the Surgeon must furnish his Patient with a cooling anodyne Collyrium *ex Aq. Rosar. Damasc. cum albumine ovi conquassata, & pauxillo Saccar. Saturni, vel Lap. Tutie preparat.* with which the Eye is to be frequently washed; not neglecting to bleed the Patient at the same time, if there be any considerable Inflammation.

Methods of
Expulsion.

C H A P. XLIII.

Of TUBERCLES and EXCRESCENCES on the EYE-LIDS.

Kinds.

I. **T**HE preternatural Tubercles, which we frequently meet with upon the Eye-lids, are of various Sorts and Sizes. If the Tubercle be small, hard, red, immoveable, and seated upon the Eye-lid above the *Cilia*, or Range of Hairs, it is then denominated by the *Greeks*, *Crithe*, and by the *Latins*, *Hordeoleum*, from its supposed Resemblance to a Barley-corn. This Tumor is included in a Kind of Cyft, which, by Inflammation, degenerates into a thickish Matter: From whence frequently proceed intense Pains and various other Disorders of the Sight. The Seat of the *Hordeoleum* varies, being sometimes immediately next to the Skin, and sometimes within-side the Eye-lid, under its Muscle. When the Tubercle is moveable, 'tis usually denominated *Chalazium*, or a Stithe. Some are termed *Grandines*, as being like Hail: Others are named *Hydatides*, being Vesicles replete with watery Humour. Sometimes several Species of the encysted Tumors are formed upon the Eye-lids, as the *Atheroma*, *Steatoma*, and *Meliceris*: Of which we have already treated in *Chap. XXVIII.* preceding. It may be here observed once for all, that almost all the Tubercles on the Eye-lids are of the encysted Kind, some having a small depending Basis, and others a broad one, as may be seen in *Tab. XV. Fig. 16, 17, 18.*

Prognosis.

II. We are, from the Importance and Obviousness of this Organ, obliged to undertake the Cure and Removal of many of these Tubercles: Which, in other Parts of the Body, might be very well neglected. Yet we ought not, even here, to call in the Assistance of the Knife, when they are very small, and not troublesome to the Sight; for they are often tolerable without Danger, though they may perhaps give a little Deformity. 'Tis remarkable, that these Tubercles seldom give Way to topical Remedies: Nor should you be over-forward with the Use of emollient Cataplasms, which are recommended by some; because the Eye itself may be injured by them, and therefore Extirpation is to be preferred.

Cure.

III. Almost all Tubercles of the Eye-lids, which do not hang pendulous by a small Root, are removed by making an Incision through the Integuments by the Scalpel, so as to avoid wounding the Tumor, in order to take it clean out, as we before directed for encysted Tumors in *Chap. XXVIII.* foregoing. But if the Coats of the Tumor are wounded, or adhere very firmly to the adjacent Flesh, so that it cannot well be extirpated whole by the Scalpel, it may be cut out as far as you well can by a Pair of small Scissors; and the Remainder eroded and cast off by dressing with *Ægyptiacum*, or some other digestive Ointment, mixed with *Præcipitat. rub. vel Lap. infernal.* After which you may complete the Cure with Balsams, as in other Wounds. In some Cases, when I think the Tumor cannot be totally extirpated, I make an Incision through its including Cyft, together with the common Integuments; and, after expelling or discharging its Contents, destroy the rest with Digestives and Caustics, as I directed for encysted Tumors. But here you must be very careful to prevent any of the Caustic from falling into the Eye, which might greatly injure, if not destroy

destroy its Sight. But we are furnished with a much more ready and easy Way of removing those Tubercles of the Eye-lid, which hang pendulous by a small Root, as at *Fig. 17* and *18*. which is, either to cut them off instantly by a Pair of Scissors, or else gradually by a Ligature with a Silk Thread. But another Method must be taken with the *Hordeolum*: Because that, contrary to most encysted Tumors, is usually attended with Pain and Inflammation. Therefore in these last it will be proper, first, to try to disperse them by discutient Applications: And if that will not succeed, to bring them to Suppuration before they are incised. It will greatly conduce to disperse and ease the Pain of an incipient *Hordeolum*, if the Patient frequently foment it with his fasting Saliva, or else with a Mucilage *ex Sem. Cydonior.* or the Pulp of a roasted Apple mixed with a little Saffron and Camphire. If none of these succeed, but the Tumor holds on its Inflammation, and begins to turn yellow, you may ripen and break it with a *Diachylon* Plaster, or a Mixture of Honey and Meal. But the Cure of it will be sooner completed, if you invert the Eye-lid, by Incision with a Scalpel across the Tumor, so as to separate the Skin of the Eye-lid, and extract the Cyst entire, if it be hard; otherwise you may open the Cyst, and discharge its included Matter, and destroy the Remainder by Digestives: By which means you will avoid an unsightly Scar in the Eye-lid, and the Wound itself will heal without the Application of other Medicines.

C H A P. XLIV.

Of WARTS on the EYE-LIDS.

I. **T**HE Eye-lids are frequently molested as well with Warts as the forementioned Tumors, which often both obstruct the Sight, and disfigure the Eye: For which Reasons the Patient is desirous of their Removal. These Warts adhere to the Eye-lids, either by a broad or slender Basis; and may be extirpated either by the Knife, Ligature, or Caustics, in the Manner we directed for Warts in general, in *Chap. XXVI.* preceding. You must never apply the actual Caustery to destroy these Warts, as you may for those in other Parts of the Body: Nor should you apply Caustics but with the greatest Circumspection; lest, if any Part should slip into the Eye, it might greatly injure, or destroy the Patient's Sight^a. If a Wart on the Eye-lid appears blackish, or livid, you will generally have Reason to fear its turning cancerous, as it will do, especially if irritated with Instruments or Medicines. For this Reason, these are usually termed, *Noli me tangere*, by the most expert Oculists: So that it is best to leave this Species of Warts to themselves. I happily removed a large Wart from the upper Eye-lid by Ligature, which had no broad Root, but impeded the opening of the Eye-lids: The Figure of which Wart you may see in *Tab. XV. Fig. 17. A.*

^a Thus TIMÆUS à GULDENKLE, *Lib. I. de Affect. Capit. Cap. XXI.* relates the Case of a Surgeon, who blinded a Woman by endeavouring to remove a Wart from her Eye-lid by the caustic Juice of Spurge.

C H A P. XLV.

Of Relaxation and Tumor of the EYE-LIDS, termed Phalangosis and Ptoſis.

Nature of
the Diſorder.

I. **W**E frequently meet with the Eye-lids either tumified, or relaxed to ſuch a Degree, as greatly deforms the Eye, and impedes its Viſion. Sometimes the relaxed Eye-lid ſubſides in the Manner represented by *Fig. 19. Tab. XV.* occaſioned either from a Palfy of the Muſcles, which ſuſtain and elevate the Eye-lids, or from a Relaxation of the *Cutis* above, from various Cauſes. Sometimes an œdematous or aqueous Tumor is formed on the Eye-lids, ſo as almoſt entirely to exclude Viſion: Which laſt Caſe ſhould be well diſtinguiſhed from the former, and may be remedied, without much Difficulty, by the Uſe of internal and topical Medicines. Such are Purges with Diuretics and Sudorifics inwardly; and a Compreſs dipped in warm *Sp. Vin. Camph. & Aq. Calc.* externally. But, in the paralytic or relaxed Caſe, you muſt uſe nervous and cardiac Medicines, and apply a little *Balf. Peruv. cum Aq. Reg. Hungar. &c.* If theſe Medicines ſhould all miſcarry, the beſt and moſt expeditious Method is, to extirpate a ſufficient Quantity of the relaxed *Cutis*; and, after healing up the Wound, the Remainder may become ſufficiently ſhortened.

The antient
Method of
Cure.

II. The Antients contracted the Skin thus relaxed, by extirpating Part of it with the Aſſiſtance of a Ligature with a Needle and Thread. Having firſt carefully ſecured it by Ligature, by paſſing the Needle through the Bottom of the Skin, they then cut it off cloſe to the Ligature: Which, in many Caſes ſucceeded very well. Sometimes they firſt amputated Part of the relaxed Skin by the Sciſſors or Scalpel, and then ſecured the Wound, either by Ligature or Suture, with a Needle and Thread, as we read in HIPPOCRATES, (*Lib. de Viſ. acut. Sect. 66.*) CELSUS *Lib. VII. Cap. 7. N. 8.*) and PAULUS ÆGINETA *Lib. VI. Cap. 8.* But the Hæmorrhage frequently proves ſo large in this laſt Method, as to obſcure the Wound, and render it impoſſible to make a neat Suture, or Ligature: To avoid which Inconvenience, the famous German Oculiſt, BARTISCHIUS, formerly contrived a wooden Inſtrument, *Tab. XV. Fig. 19.* B B. to intercept the redundant Part of the *Cutis*, and, compreſſing it by turning the Screw D D, ſo as to obſtruct the Blood-veſſels, and hinder the Circulation, the intercepted Part mortified in a few Day's time, and caſt itſelf off.

The modern
Treatment.

III. But as the laſt mentioned Practice of BARTISCHIUS was attended with great Pain, Inflammation, and other Inconveniences; VERDUYN has much improved upon him, by making almoſt a ſimilar Inſtrument of Braſs, but with Perforations in its upper and lower Plates, as in *Tab. XV. Fig. 21.* By which Inſtrument the redundant *Cutis* is not only compreſſed, but alſo ſecured with a Ligature, by paſſing a Needle and Thread through the Apertures, and leaving about four or five Inches of the Thread hanging down on each Side; you then amputate the redundant Skin, cloſe to the Edge of the Inſtrument, with a Scalpel, or Pair of Sciſſors: After which you remove the Inſtrument, and make a Ligature with the Threads. Having performed your Operation, the Wound is, for the firſt Time, to be dreſſed with ſome vulnerary Balfam and ſcraped Lint: But, in the ſubſequent Dreſſings, you may ſpread your Lint with ſome

digestive

digestive Ointment, to be retained with Compress and Bandage, as we directed in other Wounds of this Part. After a few Days, when the Lips of the Wound appear to be pretty well closed or conjoined, you may then cut the Ligature, and carefully extract the Threads, removing them, not all at once, but one at a Time, in each Dressing, and compleating the Cure with some vulnerary Balsam and Plaster. You may cauterize the Wound before the Removal of the Instrument, which will not only suppress the Hæmorrhage, and render the Disorder less liable to return again, but may perhaps, at the same time, save you the Trouble of making a Ligature or Suture. Sometimes this Disorder is so great, as to destroy the Figure of the Eye, or so obstinate and inveterate as to return again, after a repeated Performance of the Operation; which renders the Case incurable. Lastly, we may observe, that RAW invented an Instrument, not much differing from the former in its Make and Uses; (see *Fig. 22.*) but you may see the original Invention of this Instrument highly controverted between him and RUYSEN^a, who rather attributes it to ADRIANSONIUS.

C H A P. XLVI.

Of the Trichiasis, or Inversion of the EYE-LIDS; in which the Hairs irritate the Eyes.

I. **T**HE *Cilia*, or Margins of the Eye-lids are sometimes inverted, so as ^{Cause of the Disorder.} greatly to irritate the sensible Coats of the Eye, and bring on intense Pains and Inflammation; which, without timely Assistance, may greatly injure, if not totally destroy the Sight. This Disorder is, by the *Greeks*, termed *Trichiasis*, or *Distichiasis*, *hairy*; and sometimes *Entropion*, *Inversion*, because herein the Lids and their *Cilia*, or Hairs, are inverted, so as to offend the Eye. The Disorder is generally occasioned from an irregular Cicatrix formed from a Burn, the Small-Pox, an Ulceration, or Wound from some external Injury. Sometimes a Relaxation of the Skin, and a paralytic Disorder of the Eye-lids, described in the preceding Chapter, make one of the chief Causes of a *Trichiasis*. Nor is the Cure of a *Trichiasis* to be effected without much Difficulty, especially when the Disorder is become inveterate.

II. 'Tis hardly possible for the Surgeon to remove this Disorder, so as to pre- ^{Method of Cure.} vent its returning, without exirpating the offending Hairs: Which every one must allow to be no easy Operation, that has seen any thing of the Disorder. For if you cut the Hairs close off, it will be to no Purpose, because the rigid and sharp-pointed Stumps of the Hairs will shoot up and irritate the Eye worse than the Hairs did before. Some indeed endeavour to cure the Disorder, without extirpating the Hairs, by clearing them out from the Eye, and keeping them folded back, or pasted on the Outside of the upper and lower Eye-lids by some sticking Plaster. But this Practice is not often attended with the desired Effect; because the Motion of the Eye-lids loosen the Hairs, and they become again inverted, so as to offend the Eyes, as before. In this Case therefore the Practice of some is conformable to the Advice of CELSUS (*Lib. VII. Cap. 7. N. 8.*) who directs to burn out the Roots of the Hairs, one by one, with a

^a See RUYSEN *Epist. Anat. XIII.* and RAVIUS in *Tract. de Septo Scroti.*

slender,

slender, but broad-pointed Needle of Steel, in the Shape of a *Spatula*, heated red-hot. But *ÆGINETA* (*Lib. VI. Cap. 13.*) directs to extract each Hair first with a Pair of Pliers, before the Cauterization of their Roots; which is an Operation so painful, that the Patient will hardly submit to it. Therefore some chuse to fill up the Cavities at the Roots of the Hairs, after their Extraction with *Lap. infernal.* or some other Caustic, taking great Care that no Part of it slips into the Eye. Or it will be better to touch their Cavities with a small Pencil-brush dipt in *Sp. Salis Ammoniaci cum Sp. Vini rectificatiss.* by which means they will cicatrize and close up, without producing any more Hairs. When there are many injurious Hairs to be thus extracted, it will be better to remove them at several Times, than all at once: Otherwise you may induce too great Pain and Inflammation on the Eye, whose *Cornea* should be also defended from the Caustic or Cautery here used by a smooth hollow Plate of Lead, Wax, or Horn, adapted in the same Manner as for artificial Eyes. If the Disorder should arise from a Relaxation of the Eye-lids, it will be necessary to treat it in the same Manner we directed in the preceding Chapter.

Other Methods.

III. But if all the Hairs of the Eye-lids are thus inverted, and the Patient will not permit them to be extracted by the Roots, and to be afterwards treated with Caustics; there then remains but one, and a lamentable Method of removing the Disorder, by amputating the *Cilia*, or cartilaginous Margins of the Eye-lids themselves: Which the Patient had better submit to, notwithstanding the Deformity it may occasion, rather than be blind. After the Operation, a *Collyrium* should be made, and applied *ex Aq. Rosar. alb. Ovor. & pauc. Sacchari Saturni, vel Aquâ & Sp. Vini ana*; and the Wound must be treated in the subsequent Dressings with some Balsam till it be healed. But lately *CORTUMIUS*, in a professed Dissertation *de Trichiassi*, under Professor *GOELICKE*, 1724, has proposed a new Method of removing the *Cilia*, rather by Caustics with *Lap. infernal.* than by Amputation. When the Patient is laid on his Back, he directs first to arm and defend the Eye with Lint or Leather; and then to rub the *Cilia* with strong *Lapis infernalis*, till the cartilaginous Margins of the Eye-lids with their Hairs, are eroded and removed: After which you are to dress first with dry Lint, and then with a *Collyrium ex Aq. Rosar. & Alb. Ovor.* to be often renewed. The next Day you must remove the Lint, or leathern Defensative from the Eye, to avoid an Inflammation from it: And, if any small Eschar should be formed underneath the same, it may be removed by some digestive Ointment. By which means, if you clear the Eye well from the Lint, he asserts that the Wound will be cured generally within the Space of six or eight Days.

C H A P. XLVII.

Of the Ancyloblepharon, or CONCRETION of the EYE-LIDS.

Description. I. **T**HE Disease termed *Ancyloblepharon*, is when the Eye-lids cohere, or grow to each other, or to the Eye itself. It is easily distinguishable from the glewing up of the Eye-lids in the Small-Pox and Inflammations, by an Inspissation of the Juices and glutinous Matter, by which they are strongly fastened

fastened together for some Time, but without intimately concreting, because they separate again spontaneously in a little Time afterwards.

II. Sometimes the Eye-lids cohere, so that they cannot be opened, to admit the *Causes*. Light for Vision, either in one or both of the Eyes, as in *Tab. XV. Fig. 23. AA.* Sometimes again the Eye-lids grow to the Globe of the Eye itself, either to its *Tunica cornea, Albuginea*, or both. Which Accidents generally arise from violent *Ophthalmias*, Burns with Gunpowder, or other Fire, the Small-Pox, caustic Remedies, or an Ulceration of the Parts from many other Causes. 'Tis true, this Disorder is sometimes born with the Infant; and may sometimes arise in Adults from a fleshy Excrecence in the Angles of the Eyes growing to the Eye-lids, as I had once an Instance myself. See *Miscell. Nat. Cur. Dec. II. Ann. 8. pag. 135.*

III. The Cure of all the several Species of this Disorder is, in some Measure, *Prognosis* both doubtful and dangerous, but of none more than that in which the Eye-lids are conjoined to the *Cornea*: For in that Case it will hardly be possible to free them without blinding, or at least injuring the Patient's Sight. Nor is there less Difficulty to free the Eye-lids from each other, when they cohere from a Burn. Therefore in all Burns and Ulcerations of the Eye-lids, great Care should be taken to treat them with emollient and cooling Topics, and to keep them free from Adhesions, to which all inflamed and excoriated Parts are extremely subject. When the Eye-lids grow together in the Small-Pox, they generally adhere at the same time to the *Cornea*, from whence they cannot easily be separated without injuring the Sight. For, after the adhering Parts have been freed from each other with the greatest Judgment and Caution, there are almost constantly some little Scars or Specks left upon the *Cornea*, which greatly impede the Sight for the future, and which it will be almost impossible to remove.

IV. From what has been said concerning the Nature of the Disorder, you will *Cure* readily conclude, that the Cure must consist in a skilful Separation of the conjoined Parts. In order to which, the Patient is first to be placed on a Bed or Chair against the Light, in the most convenient Position for the Operator; who is first to examine whether the Eye-lids are totally conjoined, or whether there may not be some small Interstice left, which you will generally meet with in the greater or internal *Cantbus* of the Eye next the Nose. If the Eye-lids are strictly conjoined in every Part, you may then begin to make your Division in either of the *Cantbi*, or Angles, which appears to be most convenient; but with a soft Hand, and great Circumspection, to avoid wounding the *Cornea*, or Eye itself. When you have made a small Aperture, a Pair of Scissors, or Scalpel, with a blunt Point, are to be introduced, with which (*Tab. XV. Fig. 25.*) you gradually and carefully divide the Lids from each other. But if there is naturally left a small Aperture betwixt the Eye-lids, where they do not adhere, you may then immediately introduce one of the forementioned obtuse-pointed Instruments, and proceed to make your Incision: Or, if you have none that are obtuse-pointed, introduce a small grooved Director, *Tab. XV. Fig. 24.* and then you may safely divide with the common Sort of Scissors, Scalpel, or a Lancet.

V. When the Eye-lids have been carefully separated from each other, you must then examine with a Probe, whether they adhere to the Eye itself: If they do, you must again free them cautiously with an obtuse-pointed Scalpel or *Adhesions of the Globe.* Lancet.

cet. But when the whole Globe, or the greater Part of the Eye is firmly attached to the Lids, the Operation is both difficult and dangerous; as it will be almost impossible to free the *Cornea* without injuring the Sight: Which Accident may be avoided, and the Cure more easily obtained, when the Lids adhere only to the *Albuginea tunica* of the Eye. Even Wounds of the last mentioned Tunic are of so little Consequence, that I would always chuse rather to cut off Part of that in dividing them, than to leave Part of the internal Membrane of the Eye-lid adhering to it: For the internal Membrane of the Eye-lids cannot be amputated without inducing great Injuries on the lacrymal Gland and Duct. Therefore it is highly necessary for this Operation, to be performed by an expert and steady Hand.

Treatment
after the
Operation.

VI. When the Lids have been freed from the Globe of the Eye, the next Business is, to prevent them from joining again; which they will certainly do, if not prevented by interposing some Lint, or a thin Plate of Lead, Wax, Leather, or a bit of Gold-beater's Skin, cut in the Shape of a Half Moon, and moistened with *Ol. Amygd. dulc.* Either of these are to be left several Days in the Eye, till there is no Danger of future Adhesions: And if they should fall, or be taken out, they must be again replaced in a short Time. If the Patient cannot bear the Interposition of the forementioned Plates, as is sometimes the Case, he must then frequently agitate and work round his Eye-lid, at Intervals, after having used a Collyrium *ex Aq. Plantag. Lap. tutiæ pp. & Sacc. Saturni*, or a Powder prepared *ex Saccuaro, Margaritis & Lap. Cancror.* And, lastly, the Surgeon himself must sometimes pass the obtuse End of a Probe betwixt the Lids and the Globe of the Eye, to free and keep them from Adhesions.

Adhesions in
the Small-
Pox.

VII. When the Eye-lids are glued together by a gummose and inspissated Matter in the Small-Pox, and Inflammations of that Organ, so that they cannot easily be opened; they should never be forcibly pulled asunder, but be first moistened a considerable Time with warm Milk, and other emollient Topicals: By which Means the Patient will generally be able to open the Eye himself soon after.

CH A P. XLVIII.

Of the EVERSION and GAPING of the EYE-LIDS, termed Ectropium and Lagophthalmia.

Origin of
the Disorder.

I. **W**HEN the Eye-lids are everted or retracted, so as to shew their internal or red Surface, and cannot sufficiently cover the Eye, the Disorder is then denominated *Ectropium* and *Eversio Palpebrarum*, by the *Greeks* and *Latins*. When the upper Eye-lid only is thus disordered, it is then denominated *Lagophthalmus*, *Oculus leporinus*, or Hare-eyed. Some indeed will have the *Lagophthalmia* a Retraction of the upper Eye-lid without any Eversion, so that it cannot cover the Eye: Which Accident does also happen to the lower Eye-lid, as I have often observed, without any Eversion, though it is not mentioned by others as a Species of the *Ectropium*. Sometimes this is a simple, or original Disorder; and sometimes only a Symptom or Consequence of another, as an Inflammation, Sarcoma, Tumor, &c. When the Disorder is simple, or original, it generally arises from a Contraction of the Skin of the Eye-lid by the

Scar

Scar of a Wound, Ulcer, Burn, &c. or from an Induration and Contraction of the Skin, after an Inflammation; and sometimes it may proceed in a great Measure, from the Use of astringent *Collyria*, injudiciously applied in Disorders of the Eyes.

II. The Cure of this Disorder consists in relaxing and elongating the external Skin of the Eye-lid, so as to cover the Eye: Which is often no easy Task to perform, especially when the Disorder is become inveterate. When the Disorder is recent, it will be best to try the Application of Emollients; such as the Vapours of hot Milk or Water, Oil of Almonds, or Olives, Mucilage of Quince-Seeds, Hare's Fat, *Ung. Dialthææ*, &c. to be continued for several Days on the Scar or contracted Skin of the Eye-lid; which must be often extended either upwards or downwards, according as the Disorder is either in the upper or lower Lid. When the Patient goes to Bed, it will be proper to bring the Eye-lids close to each other, and to restrain them so by Plaster, Compress, and Bandage, to be repeated or renewed every Night. But if none of these Means take effect, you must then have Recourse to the Operation, when you judge the Case curable. Which is performed in the following Manner:

Cure by Medicines.

III. First, you make a semilunar Incision in the external Skin of the Eye-lid, next its Tarsus, or cartilaginous Margin, making the Angles of the Incision downward in the upper Lid, and upward in the lower Lid (as in *Tab. XV. Fig. 26. AA.*) that, by this Means, the Skin may be elongated. If the Skin does not appear to be let out enough by one Incision, you must make two or three more, running parallel with the first, and about the Distance of a small Pack-thread from each other. When the Eye-lid is thus sufficiently elongated, you must dress the Wound first with dry Lint stuffed into the Incisions; and then with Lint, moistened with some vulnerary Unguent, which will both prevent the old Skin from uniting again, and at the same time cause new Flesh to sprout up in the Incisions, to elongate the Skin. Lastly, to forward the Extension and Cure, a Piece of sticking Plaster should be fastened to the Margin of the Eye-lid, to keep it extended either up or down: Which Method is to be continued till the Eye-lids will shut close.

Cure by the Operation.

IV. When the Disorder arises from an Inflammation, or fleshy Excrescence within-side the Lid; you must, in that Case, first, remove the Inflammation by the Remedies we have elsewhere described for that Purpose: And then, after arming the Eye with a defensive Plate, remove the Excrescence by *Lapis infernalis*^a. And thus, by removing the Impediments, the Eye will recover its former Action. When the Disorder proceeds from an *Encanthis*, *Hypersarcosis*, or *Sarcoma*, as in *Fig. 27, 28, 29. Tab. XV.* you may remove it by the Directions we shall presently give in the two following Chapters.

When the Disorder is from an Inflammation or a Sarcoma.

V. When the Skin of the Eye-lid has continued violently distorted or contracted from the Patient's Birth, there is seldom any Hope of curing it. And it is still more impossible to obtain a Cure, when the lower Eye-lid is everted through a Weakness of the orbicular Muscle in old People, without any Appearance of a Scar: In which Case the Operation will be to no Purpose. If any good can be done, it will be most likely by corroborating and spiritous Medi-

When the Disorder is incurable.

^a See IVESIUS on this Subject, *Lib. de Morb. Ocul.* See likewise ROONHUYNS, *Obs.* 18. & BIDLOO *Exercit.* p. 153.

cines both external and internal. But in general, this Disorder is always the more obstinate and difficult to cure, as it is more inveterate, or of longer Standing. We have a learned Dissertation *de Entropio* by KECKIUS, *sub Præsidio ZELLERI, Tubing. An. 1733.*

C H A P. XLIX. Of the ENCANTHIS.

I. **W**E sometimes meet with a Tubercle, formed in the greater or internal *Canthus* of the Eye, growing out either from the *Caruncula lachrymalis*, or from the adjacent red Skin: Which Tumor is sometimes large enough not only to obstruct the *Puncta lachrymalia*, but also Part of the Sight, or *Papilla* of the Eye itself^a. In this Disorder the Tears continually run down the Cheek, which greatly deforms the Eye and Face, and gives Rise to an *Ophthalmia*. See *Tab. XV. Fig. 27. A.* This Tubercle, denominated *Encanthis* by the Greeks, is of two Kinds: The mildest of which is that without Hardness and Pain: But the most obstinate and malignant Species is livid, and very painful, tending, in some Measure, to a cancerous Nature.

Treatment
of the first
Species.

II. In the Beginning of the mild Species of the *Encanthis*, it will be highly useful to scarify first, and then to apply some mild escharotic or caustic Medicine: Of which the most innocent is a Powder of *Saccar. Canariens.* & *Vitriol. alb. aut Alum. ust.* in the Proportion of five Parts of the first to one of either of the last. A little of this Powder being carefully sprinkled upon the Tumor, is afterwards to be washed out of the Eye with warm Water. If this proves insufficient, you may sometimes touch the Tubercle with *Lapis infernalis*, but with great Caution. But to turn off the Humours from the Eyes, and prevent a Relapse of the Disorder, you must have Recourse to Issues or Setons, with Phlebotomy, and cooling Purges. If you find, that the Application of the Medicines takes no Effect, or if the Tubercle is of the malignant Species, you then draw it out either with a Hook, *Tab. XV. Fig. 30, 31.* or a Pair of Pliers, or else, when it is very large, with a Needle and Thread passed through it, and tied together like a Sling for a Handle; by which you must gradually and carefully extend and draw up the Tubercle, in order to avoid wounding the Eye itself, or the lachrymal Caruncle, which would be attended with very bad Consequences. For as the lachrymal Caruncle in the greater *Canthus* of the Eye, stops and prevents the Tears from overflowing, and running down upon the Cheek, if you was to cut off Part from it, the Consequence would be a watery Eye, or constant Flux of Tears over the Cheek. It is therefore rather better to leave Part of the morbid Tubercle, than cut off any Part of the lachrymal Caruncle: Because any Remains of the first may be afterwards cleared away, by Degrees, with Escharotics, if you cannot take it off with a Pair of Scissors. After an Extirpation of the Tubercle, you must apply deterging and healing Medicines, or a Collyrium *ex Lap. Tutie, Myrrhae, &c.* till the Wound is healed.

Treatment
of a malignant
Encanthis.

III. In a malignant *Encanthis*, inclining to be cancerous, being hard, livid, and very painful, 'tis generally better to let it alone, and to mitigate its Uneasiness with cooling and lenient Collyria, than to exasperate it by the Opera-

^a See a Figure of a large *Encanthis* in PURMANNUS's *Chirurgia Curiosa*, pag. 134.



tion, or by escharotic Medicines: Otherwise you may perhaps bring on Symptoms worse than the original Disease, as is frequently done in cancerous Disorders by improper Treatment. We have an extraordinary Cure of this Disorder related by PURMANNUS in his *Chirurgia Curiosa*: In which, after having extirpated the very large Tubercle by Ligature, he applied an actual Cautery to its Root with Success.

CHAP. L.

Of the Sarcoma and Hyperfarcosis, or Excrescence formed betwixt the EYE and its LIDS.

I. **R**ELATED to the foregoing Disorder are those Tubercles, or fleshy Excrescences, on the inner Surface of the Eye-lids, termed by the Greeks, *Sarcomata* and *Hyperfarcoses*: (See *Tab. XV. Fig. 28, 29.*) which, in the Beginning, are usually very small; but by Degrees advance to a considerable Bulk. Some of them are smooth and even surfaced; and some again are rough and unequal like the Raspberry or Mulberry: Of which Excrescences I have seen and cured several.

II. I generally remove these Tubercles, first, by carefully extracting them with a small Hook, *Tab. XV. Fig. 30, 31.* and then cutting down to the Root with a Pair of small Scissors. After letting it bleed a while, I order the Patient frequently to wash his Eye with a Collyrium *ex Lap. Tutiae, Aloeae & Sacc. Saturn. in Aq. Ros. Solut.* till the Wound is healed. Instead of a Hook you may also extend the Tubercle, by passing a Needle and Thread through it. Some endeavour to remove these Tubercles by Escharotics, and *Lap. infernalis*: But I think Incision to be much safer, as well as more expeditious, and less painful.

An EXPLANATION of the FIFTEENTH PLATE.

Fig. 1. Is an Iron Cautery to make Issues in the Head: A the Handle, B the Cautery.

Fig. 2. A denotes the Cannula to receive and direct the Cautery, *Fig. 1.*

Fig. 3. The *Trepan* which I use. A denotes its *Crown*, B the Place where the Crown is screwed on. C C the upper Part of the Handle, upon which the Hand is laid in the Operation. D the Arch of the Handle by which the Instrument is moved round; E a Spike in the Crown. The Moderns have a Method of fastening the Crown on the *Trepan*, otherwise than by screwing: but this is my Way.

Fig. 4. Represents the Spike taken out of the Crown.

Fig. 5. Is the Key or Winch, by which the Spike is taken hold of and screwed into the Crown.

Fig. 6. A lenticular Scalpel, with which the rough Edge of the Bone is smoothed after the Use of the *Trepan*.

Fig. 7.

- Fig. 7. Is a Steel Instrument, commonly called a *Depressor*, with a flat Button at its End, to press down the *Dura Mater*, and discharge the latent Blood. The same Instrument is also by some termed *Meningophylax*.
- Fig. 8. Is a kind of *Terebra* to be fastened to the Handle at B, Fig. 3. after having taken off the Crown, being used to make the first Entrance for the Spike of the Trepan, and to perforate Bones in the *Spina Ventosa*; whence it is also sometimes named the *perforating Trepan*; A denotes its Point, B the Screw to fasten to the Handle.
- Fig. 9. Is a Hair-brush to cleanse the Teeth in the Crown of the Trepan.
- Fig. 10. Is the exfoliating Trepan, which is sometimes used to pare away a carious Part in a Bone. A its Point; B B the Wings which scrape the Bone, when the Instrument is turned round.
- Fig. 11. A Dossil of Lint, furnished with a Thread, for dressing the trepanned Cranium.
- Fig. 12. A Pledgit, or round Compress of scraped Lint secured with a Thread.
- Fig. 13. Is another Pledgit of Lint without a Thread, to fill the Aperture of the Cranium.
- Fig. 14. Is the Leaden Plate of BELLOSTE, to defend the Aperture and Dressings.
- Fig. 15. Denotes the Shape in which the said Plate is to be first bent.
- Fig. 16. A denotes an encysted Tumor, or *Atheroma*, in the upper Eye-lid; and B is another in the lower Eye-lid.
- Fig. 17. A large flat Wart on the upper Eye-lid, having a slender Root, so as to fit it for Removal by Ligature with a Piece of Silk.
- Fig. 18. Is a *Sarcoma* or Excrescence on the Outside of the Eye-lid, with a small Root.
- Fig. 19. Represents the *Phalangosis* and *Ptofsis*, or Tumor, and Relaxation of the Eye-lids. A denotes the Disorder in the Left Eye: B B an Instrument contrived by BARTISCHIUS, adapted to remove this Disorder in the Right Eye: D D a Screw by which the two Arms of the Instrument are approximated, or brought together.
- Fig. 20. Is an Instrument like the first, but improved by VERDUYN, and as it is figured by RUYSCH, in *Epist. Anat. XIII.* AA and BB denote the two Arms of the Instruments without any Perforations, to remove various Turbuncles by approximating them by the Screw CC, and moving the Hinge D, by which they are connected.
- Fig. 21. Denotes the same Instrument of VERDUYN, only a little larger, and perforated with many small Holes *a a a a a*, to make a Suture for this Disorder of the Eyes.
- Fig. 22. Is an Instrument for the same Use corrected by RAW, and taken from his *Epist. de Septo Scroti*, being made more crooked, and shutting differently. A the Manner of passing the Needle through its Apertures: B the Thread drawn through to conjoin the Wound of the Eye-lid.
- Fig. 23. Exhibits an Eye with the *Ancyloblepharon*, or Concretion of the Eye-lids, marked AA.
- Fig. 24. Is a small grooved Director, sometimes useful to divide Concretions of the Eye-lids.

Fig. 25. A small Scalpel with an obtuse Point, used in several Disorders of the Eyes.

Fig. 26. Represents the Manner of incising the lower Eye-lid in the *Ectropium*, or *Lagophthalmia*, or Eversion and Retraction of the Eye-lids.

Fig. 27. Represents an *Encanthis*, or Excrescence in the Corner of the Eye near the Nose.

Fig. 28 and 29. Denote a *Sarcoma* and *Hyperfarcosis*, or fleshy Excrescence within-side the Eye-lid; that marked A belonging to the lower Eye-lid, and that at B to the upper Lid.

Fig. 30. Represents a small Hook, for elevating and extending those Tubercles, to extirpate them: The crooked Point of which may be made either single or double, as you may see by removing the Gripe B in Fig. 31. where C C denote the two Prongs, D D the Handle.

CHAP. LI.

Of BLEEDING in the EYES.

I. **T**HOUGH Blood-letting in the Eyes has been, a few Years ago, advanced by the *English* Oculist Mr. WOOLHOUSE, as an Invention of his own; yet it manifestly appears, from various Treatises, that the Operation was both known, described, and practised above an hundred Years before among the *German* Physicians^a. This Operation is cried up by Mr. WOOLHOUSE, as of greater Consequence than any other Discovery in Physic: He even thinks it preferable to the celebrated Philosopher's Stone^b.

II. Blood-letting may be successfully used in the Eyes: 1. Whenever those Organs are inflamed; that is, when the Blood-vessels, spent on the White of the Eye, appear much larger and more numerous than usual: Wherein it will often succeed, when other Medicines, and even Phlebotomy, have been tried without their due Effects, and when the Inflammation runs to such a Height as to endanger the Sight. 2. It may be used to Advantage when the *Cornea* is infested with Specks or Abscesses: For, after dividing the Vessels which supply the Disorder, it may be much more easily removed. 3. It may be used when a red Coat or Film grows upon the Eye: For the oftener the Vessels are incised, which nourish the Film; the sooner it will shrink, and disappear. Lastly, 4. it may be used by way of Prevention, when the foresaid Disorders have been removed, and threaten a Return, by the Intumescence of the Vessels in the White of the Eye: In which Case you therefore ought to incise the turgid Veins, and foment them.

^a See MAUCHART, in *Dissert. de Ophthalmoxysi*, pag. 18. FELIX PLATERUS *Prax. Med.* 8. Lib. i. Tit. de *Visus Laes.* 1609. pag. 280. & 4to *Basil.* 1656. pag. 238. He is again cited on this Head by M. A. SEVERINUS, in *Medicina Efficaci*, Anno 1682. edit. pag. 50. Cap. x. which treats of letting Blood in the Eyes.

^b See the *Dissertations savantes & critiques de M. WOOLHOUSE*, pag. 310. and *Dissert. Ophthalm.* pag. 224.

Method of
Operating.

III. There are several Ways of performing this Operation, of which we shall here only relate the chief. First, the Patient is to be seated conveniently on the Bed-side, or on a Chair, with his Head held in a proper Posture by an Assistant: Which done, the Surgeon makes a transverse Incision with a Lancet upon the turgid small Veins in the Corners of the Eye, so as to open them, or cut them quite asunder. Some use a small Pair of Scissors, instead of a Lancet, to divide the Vessels: But, in using either of them, the Eye-lids must be held apart from each other by the Fingers of one Hand, while the Vessels are incised by those of the other. Some, again, elevate the small turgid Veins with a crooked Needle before they divide them, the Eye-lids being, in the mean time, held asunder by an Assistant^a. But it would be still better to have these crooked Needles made thin and double-edged, so that they may divide the Vessels, of themselves, in the Elevation, without the Use of Lancet or Scissors. Lastly, there is no material Objection, why this Operation may not be almost as advantageously performed by the scarifying Instrument we shall describe in the following Chapter.

What is to
be done after
the Opera-
tion.

IV. The small Veins being thus incised or divided, their Discharge of Blood should be promoted by Fomentations of warm Water, or a Decoction *ex Euphrasia Hyssop. Veronica, &c.* frequently applied to the Eye by means of a Sponge, or soft Linen Rags. For this Operation will be more serviceable, as the Discharge procured is more copious. But if once performing it does not suffice to remove the Swelling and Inflammation, it may be safely repeated two or three Times more; assisting it in the mean time with the Use of a proper Regimen, Diet, and Medicines both external and internal. I must indeed confess, that after having performed this Operation myself, on several Patients, first at *Altorf*, and since at *Helmstadt* in *Germany*, I could not possibly prevail on them to have it repeated, and it was with the greatest Difficulty that they were persuaded to it at all; some being deterred from it by fear of losing their Eye-sight, and others upon the Account of the great Pain which it must necessarily inflict on this tender Organ. The Reason of its being seldom performed on Infants, is the Difficulty of persuading them to hold their Head and Eyes steady: And the Danger of applying a Lancet, or other sharp Instrument, when those Parts are in Agitation, is very apparent to every one.

Another
Method.

V. To this Operation is related that by Incision, proposed in a Dissertation under CAMERARIUS at *Tubingen*, *Ann.* 1734. for a venereal Ophthalmia: In the most violent Symptoms of which Disorder it is advised to make a circular Incision in the White of the Eye round the *Cornea*, to discharge the stagnant Blood, or other Matter distending that Membrane, and obstructing its Vessels. But whether this is a safe and useful Practice, or whether it may not be used with Success in other violent Ophthalmias, as well as the Venereal, can be only ascertained by the best of Teachers, Time, and Experience.

^a This is the Method preferred by M. ST. YVES, in *Lib. De Morb. Oculor.* pag. 195.

C H A P. LII.

Of SCARIFYING the EYES.

I. SCARIFICATION of the Eyes agrees, in many Respects, so much with the Bleeding of them, described in the last Chapter, that it is no great Wonder Mr. WOOLHOUSE, though a famous Oculist, should confound them one with the other^a. But I think there is a manifest Difference, at least enough for any one to distinguish betwixt them, because the Parts are different; for the interior Surface of the Eye-lids are here the Subject of Scarification, as well as the White of the Eye, to which the foregoing Operation is confined: And then again they are each of them performed by different Instruments, as will presently appear.

Coincides much with the last Operation.

II. That Scarification of the Eyes is no modern Invention, is apparent from its having been described and performed by HIPPOCRATES^b, CELSUS^c, ÆGINETA^d, and others among the antient Physicians. But there are several Reasons to be offered for its having come into Disuse with the Physicians of the succeeding Ages. It might be owing partly to its seeming a difficult, dangerous, and very painful Operation, and partly from their judging it to be of little or no Efficacy, as we find by many of their Writings. However, the first that revived the Practice among the Moderns, after it had lain neglected for so many Ages, was the celebrated *English* Oculist Mr. WOOLHOUSE.

Not a new Operation.

III. To scarify the Patient's Eye, he must be first seated on his Chair or Bed in an advantageous Posture against the Light, with his Head secured from moving by an Assistant: After which the Operator presses his Thumb and Fore-finger on the Eye-lids, so as to elevate, or open, and turn them outward, that their interior red Surface may come into View; which may be done with most Ease in the lower Eye-lid. He now takes his scarifying Instrument in the other Hand, and rubs it backward and forward with great Swiftnefs upon the internal Surface of the Lid, and upon the White of the Eye itself, if he thinks proper, and sometimes even upon the *Cornea*, moving from one Corner of the Eye to the other, so as to lacerate the small turgid Veins, and make them bleed plentifully. But this in general is an Operation much sooner learned from Inspection, than a verbal Description.

Method of Operating.

IV. The Discharge of Blood from the scarified Vessels should be promoted as much as possible by the Applications proposed for that Use in the preceding Chapter, at Sect. IV. which will also cleanse the Eye, and abate its Inflammation at the same Time. But, in order to prevent the scarified Parts from adhering to each other, they should not be bound up, at least in the Day-time, but the Lids ought to be frequently agitated by the Patient: And if they are bound up at Night, you ought, first, to interpose a Bit of Gold-beaters Skin, or some such Substance, to keep them asunder. Mr WOOLHOUSE recommends the Interposition of three or four Seeds of Clary for this Purpose, or rather a Bit of Gold-beaters Skin anointed with some Eye-salve: For without some such Precaution, you will hardly avoid Concretion or Adhesion of the Parts scarified.

Treatment after the Operation.

^a See MAUCHART *De Ophthalmoxysi*, pag. 17. ^b Lib. *De Visione*. ^c Lib. VI. Cap. 6. N. 26.

^d Lib. III. Cap. 22. *De Trachomate*.

How long the Scarification must be continued, or how often repeated, will belong to the prudent Physician to determine, from the particular Circumstances of the Case. But in the mean time it will be highly necessary to call in the Assistance of a proper Regimen, Diet, and Exhibition of both external and internal Medicines; for, by neglecting these Helps, your Operation may not only prove ineffectual, but perhaps induce a worse Disorder on the Eye. Consult PLATNERUS's Dissertation *De Scarificatione Oculorum*, pag. 36, & seq.

The Instruments to be used.

V. The Instruments used by different Authors for this Operation, are various. HIPPOCRATES seems to have used a Sort of prickly Thistle, like the *Atractylis*^a. Some of the antient Physicians scarified with a small Steel Rasp in the Shape of a Spoon: See *Tab. XVI. Fig. 5.* with which they rubbed the internal Surface of the Eye-lid till it bled, as we read in CELSUS (*Lib. VI. Cap. 6. N° 26.*) and ÆGINETA *Lib. III. Cap. 22.* the first of which Authors call it *Specillum asperatum*, and the last *Blepharoxyston*. Others use the rough Plant, named by Botanists *Equisetum magis nudum*, which seems to be very well adapted to the Intention. Others again recommend the Pumice-stone, *Os Sepiæ*, &c.

The latest and best Instrument.

VI. But the latest and best Instrument for this Operation is found to be the Beards of Barley or Rye, which are furnished with Rows of small Teeth or Hooks denoted by A in *Fig. 3. Tab. XVI.* Ten, twelve, or fifteen of these Beards are to be cut and tied together by a String, so as to resemble a Sort of Brush for Clothes, as in *Tab. XVI. Fig. 4.* the Teeth of each Beard or Spike being turned outward all round, their slender Ends form a Sort of Handle A, to be held and worked round and across by the Fingers, to scarify the Inside of the Eye-lids, and the Eye itself with the Part B. Hence this Scarification of the Eyes is, by the modern Surgeons, not improperly called *Ophthalmoxysis* or *Blepharoxysis*.

Its Inventor.

VII. The first Contriver of this Brush for the Eyes appears to be Mr. WOOLHOUSE, the Oculist: Who, though he preached up the great Uses of his Instrument to his Pupils, yet studiously endeavoured to conceal it, and its Application, from them. Till, in 1726, M. MAUCHART (present Professor at *Tubingen*, and Archiater to the Duke of WIRTEMBERG) his *quondam* Pupil, published both his Instrument and its Uses, with the Method of applying it. About two Years afterwards, the celebrated PLATNERUS of *Leipsic* explained the whole Business more at large, in a Treatise *De Scarificatione Oculorum*: In which we have the Figure of the Eye-brush used by Mr. WOOLHOUSE, as you find it represented by me in *Tab. XVI. Fig. 4.*

Uses of the Eye-brush.

VIII. This Eye-brush, or Scarificator, is said by the Author, Mr. WOOLHOUSE to be very useful in all Disorders of the Eyes which require Bleeding: As when the small Vessels are obstructed, and the whole Eye inflamed, whether from external or internal Causes, as a Blow, Wound, Cataract, Pterygium, Hypopyon, Staphiloma, or the like. In all which Cases, the internal Surface of the Eye-lids should be chiefly scarified, in order to discharge the hesitating Blood. And, if I may credit Mr. WOOLHOUSE, this Practice is more effectual in removing Inflammations, induced by external Causes, or a Chirurgical Operation, than

^a See MAUCHART, lib. c. pag. 6, & seq. PLATNER, l. c. pag. 25.

in original Ophthalmias or Inflammations of the Eyes. But in the *Chemosis*, or most violent Inflammation of this Organ, it will be necessary to scarify the Eye itself with this Brush, as well as the internal Surface of its Lids. 2. He assigns the Use of his Brush to be for the Removal of the Pterygium, Abscesses, and white or other coloured Specks and Films on the Eye. For, by scarifying the *Tunica albuginea* of the Eye, and sometimes the *Cornea* itself, or rather the *Pterygium* upon the *Cornea*, the Vessels which supply those Impediments and Blemishes of the Sight are lacerated, and, with the Use of other Medicines, destroyed; and consequently they must, in a little Time, dwindle and disappear. 3. He judges his Instrument highly serviceable in strengthening and recovering a weak or impaired Sight; or even to remove an *Amaurosis*, or Cataract, which are not of any long standing: For, by the strong Stimulus of this Operation, and stagnant Humours are put into Motion, the obstructed or compressed Nerves and Blood-vessels are again opened, and rendered pervious, and the Eye, by that Means, restored to its pristine Vigour. 4. The *Ophthalmoxysis*, or brushing up of the Eye, is very serviceable for the Cure of an *Atrophe*, or *Tabes* of that Organ; as it occasions a greater Influx of Juices to the Parts, which are therefore supplied with more Nourishment. 5. This Operation may contribute to the Cure of an *Hypopyon*, or *Hypohæma*, that is, a Collection of Blood or Matter under the *Cornea*, occasioned by some Blow, or other external Violence, which must be dispersed, in order to clear the Sight. 6. This is no despicable Remedy for easing and removing intense Pains, termed by the Antients *Ophthalmoponia*, and when the Light itself is intolerable to them: For this being an internal Inflammation of the Eye, caused by an Obstruction and Distention of the Vessels near the *Retina*, the Blood discharged by scarifying with this Brush must certainly draw off what is superfluous, and greatly ease this sensible Part. And lastly, 7. The Brush will be often found very useful and necessary in Palsies, incipient Mortifications, and many other Disorders of the Eye-lids, as well as of the Eyes themselves. See PLATNERUS *De Scarificatione Oculorum*, pag. 37, & seq.

IX. But it is not to be imagined this Instrument will be useful in all Disorders of the Eyes indiscriminately, as PLATNERUS, WOOLHOUSE's Pupil, observes. When Scarification is improper. For it will be improper, 1. in a dry *Lippitudo*, or *Xerophthalmia*, where the Eye is hot, dry, itches, and the Patient cannot look at the Light without great Pain. It will be also equally improper, 2. in Disorders of the Eyes from a *Venerical* or *Scorbutic* Cause: For, unless the Vices of the Juices be first corrected and removed, as this Operation augments their Influx upon the Parts, it may increase, rather than relieve the Disorder. Nor will it be to any Purpose to try the Brush, 3. in an old *Cataract*, *Gutta serena*, or *Hypopyon*, where the Disorder is become fixed and incorrigible by Length of Time. And, lastly, you must not expect it to cure, 4. an *Ectropium*, *Trichiasis*, *Anchylosis*, and many other Disorders of the Eye-lids, for which it is not designed.

X. With regard to the Eye-brush before described, it is to be observed, that a small Force will blunt it, and therefore it cannot well be used more than once: A new Brush must be provided against every Operation. 'Tis to be likewise observed, that the Beards of old Barley are not so proper as those of new, which is not altogether full ripe: Because the first, being very brittle, will be apt to shatter, and leave some of its Teeth behind in the Coats of the Eye,

which may be followed with bad Consequences. For the same Reasons also it should not be the Product of too rich a Soil, nor have passed under the Action of the Flail in thrashing the Grain.

My Opinion
of the Ope-
ration.

XI. After all, I must confess, that, upon Trial, I never could experience any great Effects from this Operation, which I have frequently performed in most Disorders of the Eyes. And, what is more, I have known many Patients afflicted with various Disorders of the Eyes, which have been reported, by WOOLHOUSE, and his Pupils, to be cured by this Practice, when the only real Advantage they received from it, was the Abatement of their Pain: Which I take Notice of thus openly, lest it might be imagined; I did not succeed for want of operating as I ought, in the Manner of Mr. WOOLHOUSE. I must indeed own, that it makes an useful Evacuation in *Ophthalmias*, and that I have often experienced its good Effects in many inflammatory Disorders of the Eyes, especially when assisted with Phlebotomy and Blisters: And thus I make no doubt but its Author and his Followers may have cured many Diseases of the Eyes. But it may, in general, be questioned, whether those Disorders would not have gone off as readily by Bleeding, Purging, Blisters, and Scarification in other Parts, as by this Practice: At least the Difference will hardly countervail the extraordinary Pain it gives. We know, that Disorders of the Eyes were very well cured before the Discovery of this Practice by Mr. WOOLHOUSE, and may perhaps be better removed at present by some, who are ignorant of his *Apparatus*. At least this I may venture to say, that if, with Difficulty and much Persuasion, you draw in the Patient to submit once to so rough an Operation upon so tender an Organ, you will not find it practicable to allure him to it a second Time. Children in particular, who yet are more subject to Disorders of the Eyes than Adults, are scarce ever prevailed on to undergo the Operation: And Female Patients are extremely averse to it. Nor shall I insist upon the ill Consequences attending the Teeth of the Instrument's being left sticking behind in the Coats of the Eye, and the wounding of the *Cornea*, &c. from the intense Pain obliging the Patient to move his Head and Eye, which may cause an Inflammation even worse than the Original. Even the most prudent Oculists are obliged to own, that the Practice is beset with many Inconveniencies in the very Disorders to which it is most adapted: Nor can we meet with Examples enough of its good Effects to over-balance the Danger and excruciating Pain that attends it. I would therefore advise the young Surgeon not to be over fond of his new Eye-brush, nor bring it into his Practice but in Cases of the last Necessity, when all other Means are ineffectual. It is also remarkable, that among the modern *French* Surgeons and Oculists, none take any Notice of this Practice but ST. YVES, notwithstanding it made so much Noise at first. In general, the *French* Surgeons are very scanty and defective in treating on Disorders of the Eyes.

C H A P. LIII.

Of the EPIPHORA, or WATERY EYE.

I. **T**HE *Epiphora*, or watery Eye, is a Disorder, in which the Tears, being ^{Nature of the Disorder.} obstructed from passing through the lacrymal Ducts into the Nose, are forced to run down over the Cheek with Deformity and Uneasiness to the Patient. There are some indeed who confound this Disorder with the *Fistula lacrymalis*; but unjustly; because in the last the Tears are not sincere, but mixed with a purulent Matter flowing from an Ulcer in the lacrymal Sack. But, that the Nature of both these Disorders may be the better understood, it will be proper to give you an Idea of the Course and Figure of the lacrymal Ducts, as you will find them represented in *Tab. XVI. Fig. 6.* where *aa* denote the *Puncta lacrymalia* in the Eye-lid, *b* the *Caruncula lacrymalis*. *Fig. 7* and *8.* represent the lacrymal Ducts of each Eye separated and here entire: *aa* denote the *Saccus lacrymalis*, as it is called; *bb* the *Puncta lacrymalia*, with their small Tubes or Ducts, *cc*, leading into the lacrymal Sack. The Letters *dd* denote the *Canalis nasalis*, opening into the Nose by the Aperture *ee*. In *Fig. 9.* you have a View of these Ducts annexed to the Eye, where the lacrymal Points are marked *aa*; the Caruncle *b*; the Ducts from the *Puncta lacrymalia* *cc*, leading into the *Saccus lacrymalis* *d*, thence into the *Canalis nasalis* *e*, and by that into the Nose through the Aperture *f*^a.

II. This Disorder of the Eye may proceed from many Causes, which impede ^{Causes.} or obstruct the Passage of the Tears into the Nose through the before-described Parts. Thus, if the *Puncta lacrymalia* are stopped up, it will produce an *Epiphora*, or watery Eye. But as long as the Passages into the Nose are clear, that Humour, which is separated by the lacrymal Gland, to moisten and cleanse the Eye, will be drank in by the lacrymal Points, conveyed from thence into the Sack, and from thence it will, by Degrees, pass into the Cavity of the Nose itself. The *Epiphora* may therefore proceed, (1.) From some hard Tumor or Tubercle, as the *Encanthis*, in the greater Canthus or Angle of the Eye, obstructing the *Puncta lacrymalia*. (2.) From a Contraction or Concretion of the *Puncta*, after a Wound, Ulcer, or Burn of the Eye-lid: And (3.) From the same Causes, or from an Obstruction of the *Canalis nasalis*; as may frequently happen in an Inflammation, from an inspissated or gummy Matter. (4.) It may be caused by a Polypus, Caruncle, or Excrescence in the Nose, compressing and occluding the lacrymal Duct internally. (5.) From a *Fistula lacrymalis*. (6.) An *Ectropium*, or Inversion of the Eye-lids. (7.) From an Erosion, or Loss of the *Caruncula lacrymalis*. And, lastly, (8.) From a Wound in the lacrymal Duct, blocking up the same with an ill-formed Cicatrix.

III. The Disorder itself may be readily discovered both from the Looks and ^{Diagnosis.} Relation of the Patient: But, to find out its immediate Cause, requires much more Attention. When it arises from a Loss of the lacrymal Caruncle, a Dis-

^a This Passage of the Tears is by many thought to be a modern Discovery. But the celebrated Anatomist MORGAGNI, in his first and sixth *Adversaria Anatomica*, has demonstrated the Course to have been known and observed by GALEN, VEGETIUS, BERENGARIUS, FALLOPIUS, CARCANUS, STENO, &c. After MORGAGNI this Part has been explained at large by ANELIUS, in *Lib. De Fistula lacrymalis*, and MEIBOMIUS, in *Epist. De Vasis Palpebrarum novis*

tortion of the Eye-lids, an Encanthis, or a Polypus, in the Nose, the Cause is generally obvious enough. But when it is from a Concretion of the *Puncta*, the Cause can only be known by Inspection, and considering whether there has been any Wound or Burn, &c. When the *Puncta* remain open, and the nasal Canal is concreted or obstructed, the Tears have a ready Admittance into the Saccus, but not into the Nose: Which therefore distend or dilate the Sack, from whence the Disorder is sometimes named a *Hernia lacrymalis*; and by ANELIUS it is termed a *Hydrops Sacci lacrymalis*^a. In this Case, upon pressing the Finger on the lacrymal Sack, it does not discharge its Contents into the Nose as it ought, but the Tears return again through the *Puncta* into the Eye. See *Tab. XVI. Fig. 10. A.* Sometimes the lacrymal-Sack is thus dilated, so as to form a very conspicuous Tumor externally; which, by Pressure with the Finger, will for the present be greatly diminished, or else totally disappear. If the Disorder is at the same time accompanied with a *Fistula lacrymalis*, the afore-said Pressure will discharge a purulent Matter along with the serous Humour: Whereas in the simple Epiphora, it will appear quite limpid and aqueous.

Prognosis
and Cure.

IV. The Prognosis and Treatment of this Disorder will turn out various, according to the particular Cause and Circumstances. When accompanied with an Encanthis, Polypus in the Nose, a Distortion of the Eye-lids, or a *Fistula lacrymalis*, the Epiphora cannot be cured, till you have first removed those Symptoms which cause it. When it arises from a Concretion of the *Puncta lacrymalia*, you should carefully examine whether the Ducts leading into the *Saccus*, marked *cc*, *Fig. 7* and *8*, are all along closed and concreted, or whether their Orifices only are occluded with a thin Film. For, if they are all the Way concreted, whether from a Cicatrix, Wound, or Burn, there will be no Possibility of a Cure: Whereas the thin Skin occluding their Orifices, may be easily perforated with a small Needle, and kept open, till they are healed, with a Bristle, or Silver Wire, dipped in *Ol. Olor.* as at *Fig. 11, 12, 13.*

Obstruction
of the Duct.

V. If the *Puncta* appear to be pervious, and in their natural State, you may conclude the *Canalis nasalis* to be obstructed: Which being usually occasioned by a glutinous Matter, may be generally removed, so as to cure the Disorder, if it has been too long neglected. To disperse and remove the Matter, Discutients must be often applied with repeated Pressure by the Finger, to expel the stagnant Humours, that they may not become acrimonious, erode the Membranes, and bring on a *Fistula lacrymalis*. One of the best Discutients for this Purpose is a Tincture of Aloës diluted in some Eye-water, or an Infusion of Hyssop, Betony^b, or some mineral Waters, or the Salts extracted from them mixed with an Eye-water, &c. In the mean time should be sometimes used a Sternutatory *ex Majoran. Lil. Conval. Mar. Majoran. Hellebor. &c.* And if these Means prove ineffectual, you may treat the Patient in ANELIUS's new Method of curing a *Fistula lacrymalis*, by passing a small Silver Probe, *Tab. XVI. Fig. 11, 12, 13*, into the *Puncta*, and through the lacrymal Duct and Sack into the *Canalis nasalis*, and so into the Nose. But this is an Operation that ought not to be attempted by every one, who is not an expert Operator, and well versed in the Structure of these Parts: Otherwise you not only miscarry in your

^a In *Dissert. sur la nouvelle Decouverte de l'Hydropisie du Conduit lacrymal.* Paris 1716.

^b This Infusion is highly commended by SCHOBINGERUS, for a *Fistula lacrymalis*, in his Treatise on that Subject, p. 20.

Operation, but greatly injure the Patient^a. The Passages are to be thus cleared by the slender Probe every Morning and Evening, for several Days, injecting afterwards some of the beforementioned Liquors by a small Silver Syringe, *Tab. XVI. Fig. 14.* the slender Tube of which is to be inserted into the lower *Punctum lacrymale*, as we shall more particularly direct in the following Chapter. And thus, by the repeated Use of Injections, the Disorder will be either removed, or else degenerate into a *Fistula lacrymalis*, and must then be treated accordingly. Lastly, when this Disorder arises from a Loss of Substance in, or an Erosion of, the lacrymal Caruncle, it will be to no Purpose to use Remedies, because the Case is incurable. *Vid. HEBENSTREIT. Dissert. De Ocul. lacrym. Lipsiæ 1743.*

C H A P. LIV.

Of the FISTULA LACRYMALIS, and of the Disorders related to it.

I. **T**HE *Fistula lacrymalis* is generally understood to be a little Ulcer in the greater or internal Canthus of the Eye next the Nose, which either of itself, or by Pressure, discharges a purulent Matter. The Seat of this Ulcuscle is in the *Sacculus lacrymalis*, or Passage for the Tears into the Nose. Therefore the *Fistula lacrymalis* is more or less dangerous, in Proportion to the Size and Condition of the Ulcer, which sometimes lies concealed only in the *Sacculus*, and discharges its Matter through the *Puncta lacrymalia*: But sometimes again it not only erodes the *Sacculus*, but also the external Skin, and the adjacent Bone. If the Skin is not eroded through, the *Fistula* is thence denominated *imperfect*; as it is termed *perfect* after having made its Way through the Integuments^b: But when it has also eat through the adjacent Bone, or rendered it carious, it is then usually termed a *complicated Fistula lacrymalis*. It is remarkable, that the generality of Physicians and Surgeons had a wrong Notion of the Nature and Treatment of this Disorder, till the Beginning of the present Century. Their Error might be owing partly (1.) To the Multiplicity of Diseases to which this Part of the Eye is subject, and the Number of different Names which are frequently given to each of them. (2.) To the real Nature of the Disorder, having been examined into by very few Surgeons and Anatomists: For most of them imagined the Seat of the Ulcuscle to be either in or under the lacrymal Caruncle: Whereas the more accurate of the Moderns discovered, that the purulent Matter was discharged neither from nor behind the Caruncle, but rather out of the *Sacculus lacrymalis* through the *Puncta*^c. Having acquired a wrong Idea of the Disorder, they were consequently led by that into a wrong

The *Fistula lacrymalis* described.

^a Yet this Operation is far from being impracticable, as many Surgeons not well versed in these Disorders (and among the rest GARENGEOT) would fain persuade us. For to say nothing of ANEILIUS, I myself have often and often performed it upon Numbers of Patients.

^b This Species of the *Fistula* is what CELSUS (*Lib. vii. N. 7.*) seems to term *Aegilops*: But he does not speak very intelligibly of it in this Place.

^c FALLOPIUS was perhaps the first Anatomist that observed this, in *Tom. II. p. 224.* See also MORGAGNI, *Advers. Anat. VI. 64.*

Practice: Both which the Moderns have endeavoured to correct, and not without Success.

The different Names and Kinds of the Disorder.

II. But that our Reader may be a better Judge of the false Opinions which have been entertained and advanced concerning this Disorder by the principal Writers in Surgery, we shall endeavour briefly to relate them: And, first, some of them have by the Name of *Fistula lacrymalis* understood that Kind of Disorder which we term *Epiphora*, or the watery Eye, and have described in the preceding Chapter. (2.) Others seem to use the Terms *Fistula lacrymalis*, *Anchylops*, and *Aegilops*, as synonymous; so that there is no Possibility of knowing their Meaning, till we are furnished with the proper Distinction and Explanation of those Disorders separately. For the *Anchylops* is, by the generality of the modern Writers, used to signify a Tubercle in the greater Canthus of the Eye next the Nose, whether it be seated in or near the lacrymal Sack, or whether it be with or without an Inflammation accompanying it. It ought to be here observed, that the *Sacculus lacrymalis*, as well as other Parts, is subject to encysted Tumors, Inflammation, and Abscess, and very often to a Distension or Rupture, now termed a *Hernia lacrymalis*; (see *Tab. XXVI. Fig. 10. A B.* and *Fig. 16 and 17.*) in which last, upon pressing the Finger on the Tumor, it subsides more or less, and the serous Humour discharges itself either through the *Puncta lacrymalia* at the Eye, or into the Cavity of the Nose, or both Ways. We define an *Aegilops* to be a small Tumor formed after an Inflammation or Abscess in the greater Canthus of the Eye, near the *Sacculus lacrymalis*; which in Time, by the Acrimony of its purulent Matter, erodes the external Skin and lacrymal Ducts, sometimes eats away the Fat round the Globe of the Eye, and sometimes renders the *Ossa plana*, and other Bones near the Nose, carious to a dangerous Degree. Sometimes the upper, lower, or both of the lacrymal Ducts, are so eroded, as to discharge large Quantities of purulent Matter through the *Puncta* in the greater *Canthus*: And then it forms the *Fistula lacrymalis*, whose Characteristic is a purulent Matter. But, when the discharged Humour is quite limpid and aqueous, the Disorder ought then to be denominated an *Epiphora*, as we observed in the preceding Chapter. (See *Fig. 18. lit. a and b.*) From what we have here advanced, I think it will not be difficult for any one to distinguish the different Disorders of this Part; which, from their Affinity, are very often confounded by Physicians and Surgeons.

Causes.

III. An *Anchylops* may proceed from many Causes: And, among others, an Inflammation or encysted Tumor may produce this Disorder, as well as occasion a simple *Fistula lacrymalis*, or an *Aegilops*. Yet the first arises still more frequently from a Relaxation and Distension of the lacrymal Sack: So that we generally meet with an *Aegilops* and *Fistula lacrymalis* fixed in the greater Canthus of the Eye at one and the same time: This seems to arise from an Obstruction of the Passage of the Tears, or purulent Matter, into the Nose: The Consequence of which must be an Extenuation and Tumor of the lacrymal Sack. An *Aegilops* is generally caused by a previous Inflammation or Abscess, which frequently erode the lacrymal Ducts and the external Skin, and even produce a *Fistula lacrymalis* in its worst Degree. But though there are many more Causes besides Inflammation, which may produce a *Fistula lacrymalis*, yet there is no Cause so frequent or immediate as an Exulceration of the lacrymal Sack, or of the adjacent Membranes. But when once the lacrymal Ducts are eroded, the Matter finds

finds an immediate Passage into the subjacent *Sacculus*, as at *Fig. 18.* A *Fistula lacrymalis* may also frequently proceed from an Obstruction of the inferior lacrymal Duct, termed the *Canalis nasalis*, *d d*, *Fig. 7* and *8.* from whatever Cause that Obstruction may arise. For no Obstruction can be formed, without inducing a Stagnation of the Humour, which will therefore become acrid, distend the Duct, and either erode, or totally destroy, its Membranes. And in this Manner the Disorder is frequently occasioned in many Patients who have had an Inflammation in their Eyes, in the Membranes of their Nose, or in these Ducts themselves, or when those Parts have been injured by the Small-Pox, as I have frequently observed: Though it must be confessed, that the Disorder sometimes arises spontaneously, without the Assistance of any of the beforementioned Causes.

IV. There are various Species of these *Fistulae*. The first Distinction of them is, (1.) Into *perfect* and *imperfect*: The former of which is, when the purulent Matter flows out through an Erosion of the Skin in the Canthus; and the latter, when the Matter is discharged through the *Puncta lacrymalia*, the Skin remaining entire: Which last Kind is generally accompanied with a Tumor of the lacrymal Sack. You may have an Idea of the perfect Kind, from consulting *Tab. XVI. Fig. 19. a b.* Some of these *Fistulae* are again distinguished into (2.) *Simple* and *Compound*; the last of which is, when a Callosity, Caries, or the like, attend. Some again are, (3.) *Mild* and *recent*; others *old* and *malignant*. (4.) Some *intermitting* and *periodical*; others *continual*. Still more Distinctions of the several Species of this Disorder may be seen in *p. 8.* of our professed Dissertation on the Subject in 4^{to} 1716, at *Altorf.* We have still another Distinction of these *Fistulae* into *true* and *false*, made by M. GARENGEOT: By the *true*, he understands an Ulceration of the lacrymal Ducts; and by the *false*, he intends an Ulceration in the adjacent Parts only, which we term an *Aegilops*. Some^a will have a Callosity essentially necessary to the Formation of a *Fistula lacrymalis*; because a Callus is constantly found in most other *Fistulae*: But this is not the common and received Notion of a *Fistula lacrymalis*, as we are taught by the Authorities of CELSUS, FALLOPIUS, CARDAN, WOOLHOUSE, and MORGAGNI, *advers. Anat. VI. p. 82.* and from daily Experience. M. ST. YVES^b, the late famous Oculist at *Paris*, asserts, that he seldom found a Callus in these *Fistulae*: And I myself have observed a great many, and those inveterate lacrymal *Fistulae*, which have yet had no Callosity. There are some Surgeons again, who imagine that there never can arise a *Fistula lacrymalis*, without an Obstruction of the *Canalis nasalis* at the same time, because such an Obstruction must be the Occasion of the *Fistula*. But even this Opinion is without Foundation, as hath been long ago evinced by the Authorities of the best Writers, and as I have been frequently assured by Experience: For I have often observed, and am now acquainted with some of these *Fistulae*, in which the purulent Matter has a free Exit from the lacrymal Sack through the *Puncta lacrymalia*, if you press it with the Finger every Day; and at the same time the *Canalis nasalis* appears to be open, because the purulent Matter is also discharged through it into the Nose^c.

Kinds of the
Fistula lacrymalis.

^a As SIGNOROTTUS and PLATNERUS, in *Diff. de Fist. lacrymali*, Sect. 1, 2, 3.

^b See his *Traité des Maladies des Yeux*, pag. 59. and SCHOBINGERI *Diff. de Fistul. lacrym.* p. 3.

^c Some will have it, that the purulent Matter flows only through the upper, and others only through the lower *Punctum lacrymale*; but it has generally a Passage through both, though often more is discharged through one than the other.

Signs of the
Fistula lacrymalis.

V. Having in general described and explained the several Kinds of these *Fistulae*, and the Disorders related to them, we shall now proceed to the Signs by which they are discovered. And first, you may be pretty well assured, that the Patient has a lacrymal *Fistula*, if he complains of the Tears being more copious than usual, and running over his Cheek, and that a Quantity of purulent Matter is found collected in the Eye, in a Morning chiefly; and at the same time you observe no Appearance of Inflammation: But if you press the lacrymal Sack with your Finger, it discharges a Quantity of purulent Matter by the *Puncta lacrymalia*. This appears to me the most certain Sign of a *Fistula lacrymalis*: And with me FALLOPIUS, WOOLHOUSE, and ANELIUS concur. You may judge whether there be any Caries from the ill Smell, and from the livid or blackish Colour of the Part, with the Discharge of purulent Matter: And especially, if the Bone appears bare or eroded to the Eye or Probe, in open *Fistula*. The Colour of the Matter discharged is so far from giving a sure Indication, whether or no the Bone is carious, that I have often found it of a good Colour, when at the same time the Bone appeared rough and eroded to the Probe: But you may be generally assured, there is a Caries of the Bone, if the *Fistula* has been of very long standing, and discharges a large Quantity of Matter. But the Seat of the Caries is not always the same, being sometimes in the *Os lacrymale*, sometimes in the *Os planum*, and in the *Os maxillare superius*. You may discover whether the *Canalis nasalis* be obstructed, from little or none of the purulent Matter, or injected Liquor, being able to make its Way into the Nose, but all returning through one of the *Puncta lacrymalia*^a. A Callus in these *Fistulae* may be discovered by the unusual Hardness or Resistance which the Parts give to the Finger; but this is not a frequent Symptom in lacrymal *Fistulae*, as hath been often observed by ST. YVES, M. GARENGEOT, and myself. If these Parts are infested with an encysted Tumor, they appear preternaturally enlarged, and harder than usual, nor does the Tumor subside by pressing it with the Finger; and there appears no Sign of Inflammation. But if the Tumor subsides by Pressure with the Finger, you may conclude there is a *Hernia lacrymalis*, or Dilatation of the lacrymal Sack. Lastly, an *Aegilops* is discovered by the Appearance of an Exulceration in the Greater Canthus of the Eye next the Nose, without affecting the lacrymal Ducts.

Prognosis.

VI. The several Disorders before enumerated usually terminate differently, according to particular Circumstances. But as the Eye itself, and the spongy Bones of its Orbit, are so nearly situated, it is hardly possible the Patient should escape a Caries in the last, with many grievous Symptoms in that Organ itself. An *Anchylops* or *Aegilops* may very easily degenerate into a *Fistula*; and a slight *Fistula* may become obstinate, malignant, and even cancerous; which having destroyed the Bones, there are then but little Hopes of obtaining a Cure. These Disorders are in general more or less malignant, according as the Patient is of a good or bad Habit of Body, as the Matter of the *Fistula* is more or less acrimo-

^a I observed an uncommon Species of the *Fistula lacrymalis* here in a Student, Anno 1726; in which, though the Disorder had been of eight Years standing, yet no Matter could be discharged by pressing with the Finger. The Tears constantly issued down upon his Cheeks, and after Sleep the Eye was found replete with a purulent Matter: But when a Quantity of Liquor was injected at either *Punctum*, it ran out with some purulent Matter through the other. There was no Tumor of the lacrymal Sack; but, upon incising the Integuments, the lacrymal Bone was found carious.

monious,

monious, and as to the Patient is more or less regular in his Diet and Course of Life. If the Patient is in other Respects well, the Disorder recent, and without a Caries, Callus, or other bad Symptoms, there is no great Danger: But the Disorder may be cured, by the Method of ANELIUS, in a few Day's time. The perfect or compleat Fistula which has eroded through the Skin, is generally attended with a Caries; and is therefore hardly, if at all, curable, before the carious Bones are removed. Also a Callus must be first removed before you can cure those *Fistulae* in which it is found. But if both Callosity and Caries are absent, a Cure may be obtained with much more Ease and Expedition. Again, in general, the older or more inveterate the Fistula, the more difficult it is to cure; because in them the Bones are commonly infested with a Caries: And if that is not perfectly removed, though you should, in Appearance, cure the Disorder, it will quickly return again. But what is more than a little surprising, there are some Surgeons who write, that several of these *Fistulae* which have been accompanied both with a Callus and a Caries, have been cured barely by leaving the Disorder to Nature^a. Unless the *Canalis nasalis* be rendered pervious, and kept open, the Cure cannot be compleated: For though you remove the Callus and Caries by the Knife or Cautery, the Patient will be afterwards troubled with a watery Eye, in which the Tears run down over the Cheeks. The compressing Instruments formerly used to relieve this Complaint, do little more than molest the Patient, or frequently turn a mild into a malignant Fistula. But the Practice of the modern Surgeons is greatly to be preferred before that of the Antients in this Disorder: For the First being reformed by the Authority and Example of ANELIUS, about the Year 1712, have ever since continued to cure recent *Fistulae* of this Species after his Manner, without either the Use of the Scalpel, Terebra, or Cautery, provided there is no Callus or Caries in it, notwithstanding what others may say to the contrary. Whereas formerly they hardly ever cured a *Fistula lacrymalis* of any Kind, without the Use of one of those severe Remedies^b.

VII. If the Patient is troubled with an *Anchylops*, or Tumor or Inflammation in the greater Angle of the Eye next the Nose, the Surgeon must, in that Case, use his Endeavours first to disperse it, to prevent the Tumor from degenerating into an Abscess or Fistula. This Intention may be best answered towards the beginning of the Disorder, by moistening the Part with a little *Sp. Vitriol.* dipping a small Brush, or the End of the Finger therein, several Times in a Day, as in treating upon Tumors we directed for the Furuncle: But in this Practice you must be very careful to avoid injuring the Eye itself. Upon which Account it may, in some Cases, be safer to use a Liniment of *Mel. Rosar.* acidulated with *Sp. Vitriol.* covering the Part afterwards with a Diachylon Plaster. In most Cases, a Cure may be almost as readily obtained by frequent fomenting with Compresses dipped in warm *Sp. Vini Camph.* and a Cataplasin *ex Pomis coctis, vel assatis Camphoroque mist.* to be continued till the Tumor subsides, and the Inflammation is dispersed. If the Tumor should appear to be of the encysted Kind, you may treat it as we have directed in *Chap. XXVIII. Sect. I. N. VI.* and VII. foregoing: By which Method I happily extirpated a large encysted Tumor by the Scalpel, which was very deeply situated in the

Treatment
of the An-
chylops.

^a This does but very seldom happen. See more in MAITRE-JEAN, in *Lib. De Morbis Oculorum*, in *Cap. de Fistula lacrymali.*

^b See my Dissertation on this Subject.

Orbit of the Eye of a certain Maid. Lastly, when the Tumor arises from a Distention of the lacrymal Sack, you must treat the Disorder by the Methods we shall presently direct at N. X. following.

Treatment
of the Ægi-
lops.

VIII. If the last mentioned Tumor or Inflammation rather tends to Suppuration than to be dispersed by the preceding Treatment, it will then be proper to forward its Maturation or Conversion into Matter as much as possible, lest an obstinate Fistula, or worse Consequences, should be the Effects of too long Delay. The Suppuration of it may be conveniently promoted by a Diachylon Plaster with the Gums, or an emollient Cataplasim frequently applied warm. As soon as you can discover that the Matter is suppurated, you are to open the most depending Part of the Tumor, either with a Lancet or Scalpel, to discharge and press out the Matter, that it may not eat through its including Cyst, or the adjacent thin Bones. That being thus discharged, the Abscess or Ulcer must be next deterged by dressing with digestive Ointments, or *Mel. Rosarum cum Myrrha*, vel *Ung. Ægyptiac. seu Præcipitat. Rub. Portiuncula permist.* after which it may be healed with vulnerary Balsams, in the Manner we directed for Abscesses in general. If the Abscess in this Disorder should break of its own accord, as I have frequently known it to do, and its Aperture or Orifice appears too narrow to give a free Discharge to the Matter, it may be afterwards dilated with a Tent, prepared Sponge, Gentian Root, or rather by the Scalpel, and then treat it as before. If the Bone appears foul, it will be necessary to apply some scraped Lint, with a few Drops of *Sp. Sulph. aut Vitriol.* or a little *Pulv. Euphorb.* laying over it a Compress dipped in *Aq. Calcis*; by which Means having removed the Caries, the Wound will be disposed to heal. Sometimes it will be found necessary to exfoliate or scrape the foul Bone with the Rasp, represented in *Tab. VII. Fig. 3, 4, 5*, or *Tab. XVIII. Fig. 9*. Some Surgeons think it a more ready Method of Cure, to cauterise the Bone with red-hot Irons, adapted to a Tube or Case, as in *Tab. XVI. Fig. 21 and 22*. completing the rest of the Cure with Balsams or vulnerary Medicines, in the Manner we shall explain more at large in treating of this Disorder at N. XII. following.

Treatment
of slight
Fistulæ.

IX. The Treatment of the true Species of lacrymal *Fistulæ*, in which there is an Ulceration of the lacrymal Passages, is various, according to the different Nature, Degree, and Circumstances of the Disorder. For when the Fistula is recent, the Patient of a good Habit, the Skin entire, and the Ducts not ulcerated or obstructed, but discharging freely a mucous, and not a purulent Matter into the Nose; you ought not, in these Circumstances, to have immediate Recourse to the Knife, Terebra, or Cautery, but first endeavour to cure the Fistula by the mildest Methods of Treatment, before you try the severer Operations of Surgery. In this Case, you should frequently express the Matter included in the lacrymal Sack by your Fingers; lest it become so acrid, as to erode the adjacent Parts by its too long Stay: And, in the Intervals, you should strive to cleanse or deterge the Parts by the repeated Use of the mundifying Remedies, which we advised for the watery Eye in *Chap. LIIL. N. V.* At the same time, too, you must call in the Aid of Phlebotomy, Purges, Scarification, Blisters, Diet, and Regimen, according to the Patient's particular Habit and Circumstances.

Cure by
Compression.

X. M. DIONIS tells us, in his *Surgery*, that he has cured many of these recent *Fistulæ*, particularly in Infants, barely by Compression in a proper Manner: And GARENGEOT also affirms the same to have been done formerly at *Paris* by that

that eminent Surgeon M. ARNEAU. By the first of these the Compression was made in the following Manner: 1. First of all he imposed a Piece of *Emplastr. de Minio* upon the Tubercle or Fistula of the lacrymal Sack: Then, 2. he applied a small triangular Compress of about the Thickness of one's Finger, or, instead of the one thick Compress, several thinner ones upon each other, in order to fill up exactly the Cavity in the Angle of the Eye next the Nose. In the next Place, 3. he adapted another Compress over the former, dipping both of them first in some *Aq. Calc.* or *Sp. Vini.* Lastly, 4. he firmly secured and pressed down the Compresses upon the Tumor by a strict Deligation with a circular Bandage; that, by this Means, none of the vitiated Humours might be collected or retained, and that the relaxed *Sacculus* might, by Degrees, recover its former Tone and Dimensions. But, according to M. DIONIS, this Treatment must be continued for several entire Months to cure the Patient. It is to be observed, that some use a peculiar Instrument for compressing the Parts disordered, instead of Compresses and Bandage: Of which Instrument there are several Kinds proposed by FABRIC. AB AQUAPENDENTE, SCULTETUS, PALFYN, and myself, in *Tab. XVI. Fig. 20.* taken from PLATNERUS. But, after all, this Method by Compressure will be to no Purpose when the lacrymal Ducts are concreted or obstructed: For the Advantage of this Practice can only take Place when there is an Abscess near the lacrymal Sack, as in *Fig. 18.* or at least when the lacrymal Ducts are found pervious.

XI. When the Disorder is become so malignant or inveterate as not to be relieved by the preceding Method of Compression, the general Practice of Surgeons in that Case was formerly, and now is, to lay open the Tubercle, or distended lacrymal Sack almost in the Middle, betwixt the internal Canthus and the Nose: And this either by Caustic, or rather by Incision with a Scalpel or a Lancet; but with great Circumspection, to avoid wounding the lacrymal Ducts and *Puncta*, which lead to the Sack, or the Ligament which fastens one Eye-lid to the other, which would greatly deform the Eye. 'Tis generally advised to make this Incision obliquely: As, for Example, from *d* towards *e* or *c.* *Fig. 9. Tab. XVI.* or in *Fig. 10.* from *B* towards *A*; for which some prefer the straight, and others the crooked Scalpel: But either of them will do, in my Opinion; for I have successfully performed the Operation with both. Your Incision must be continued downward, till you have penetrated into the Cavity of the lacrymal Sack, enlarging it afterwards both upward and downward into the aforesaid Direction from the Top of the Sack down to the *Canalis ossæus*. The Wound is next to be dilated by filling it with Lint (though PLATNERUS and GARENGEOT recommend a particular Instrument for this Use) and lastly the Dressings are to be secured with Compress and Bandage. There are others again who rather approve of making this Incision in a semicircular Form like an Arch, whose Convexity must be towards the Nose, and Concavity towards the Eye; beginning the Incision at the lower Part of the *Apophysis nasalis* of the *Os frontis*, where that Bone meets the *Os maxillare* and *lacrymale*, and continuing your Incision from thence, in the Form of an Arch, to the Meeting of the internal *Apophysis* of the *Os jugali*, as we have represented by the dotted Line *cb* *Fig. 19. Tab. XVI.* When your Incision is sufficiently enlarged by the Knife, you must dilate it further with Lint, as before: By which Means you have an Opportunity the next Day of observing, whether the Bones be carious, and in what

Cure by
Incision.

Part or Manner it will be best to perforate them. If the Wound should bleed much, you may apply a Pledgit of Lint dipt in *Sp. Vini rectificatiss.* to be retained on the Part with a Compress, and a little stricter Bandage. In the subsequent Dressings you must use *Essent. Succin. Ol. later.* and other detergent Applications, as we before directed for the *Aegilops*, at N. VIII. When the Parts are well cleansed, you may finish the Cure with some vulnerary Balsam and desiccative Plaster, retained with a thick triangular Compress, as we directed at N. X. and thus the Wound gradually heals. Others again apply the compressing Instrument beforementioned upon the Wound over the Compress and Plaster; but not very often with the desired Success, because the *Canalis nasalis* is generally hereby obstructed.

The antient
Treatment
of a callous
Fistula with
Caries.

XII. In a callous *Fistula lacrymalis* the Method of Treatment used by the antient Surgeons was, to open the Ulcer first, and then to dress it with *Trochisc. de Minio, Præcipit. rub. Ung. Ægyptiac. Lap. infernal. &c.* with which they removed the Callosity, and then finished the Cure in the Manner we before directed. But if a Caries also accompanied it, they applied *Pulv. ex Euphorbio*, or *Sp. Sulphur. Vitriol. &c.* with scraped Lint. If these did not answer, they then rasped or scraped the vitiated Bone, as we directed at N. IX. or else applied the actual Cautery several Times, according as the Case required. The cauterizing Instruments used in this Disorder, were of various Figures, as the Surgeon best fancied: As you may see by those figured in *AQUAPENDENS, SCULTETUS, SOLINGEN, PALFYN, DIONIS, GARENGEOT, PLATNER, &c.* Some were used naked without any Tube, as those we have represented in our *Tab. III. Fig. 14* and *16*. Others again were furnished with a Tube, which was first placed in the Wound close to the Bone, and then the Cautery was conveyed through it, to avoid burning the Skin and Lips of the Wound: See *Tab. XVI. Fig. 21, 22*. The Eschars formed by the Cautery were afterwards separated by some digestive Ointment, and the Wound then healed with vulnerary Balsams, as we directed before. But in performing this Operation you should first not only bind up the Patient's sound Eye, that he may not be terrified at the Sight of the Cautery, but you should also secure the disordered Eye by an Instrument in the shape of a Spoon, *Tab. XVI. Fig. 23*. that it may not be touched by the Cautery. It will be also previously necessary to dry the Bone well with Lint before you apply the Cautery, which will otherwise be too soon extinguished. But, after all, this Treatment, in order to cleanse the Fistula by the Cautery, will be to little or no Purpose, so long as the *Canalis nasalis* remains obstructed. Nor can the Tears be discharged into the Nose, unless anew Passage be made for them by perforating the Bones with the Cautery: Otherwise the Patient will be continually molested with a watery Eye after the Fistula is cured: So that this Method of Cure will, in my Opinion, succeed best when the *Canalis nasalis* remains pervious and entire, or when there is a Suppuration without side the lacrymal Sack. Therefore it will be highly necessary to distinguish those *Fistulae*, in which the *Canalis nasalis* is occluded, or shut up, from those in which it is not.

Cure by per-
forating the
Os lacry-
male.

XIII. To remove the last mentioned Symptom, the watery Eye, in the Cure of these *Fistulae*, some Surgeons have proposed the following Method: *viz.* After opening the lacrymal Sack, as we directed before at N. XI. the next Day they perforated the *Os Unguis* with a sharp-pointed Instrument for the Purpose,
(*Tab.*

(*Tab. XVI. Fig. 24. or Tab. VII. Fig. 7. or Tab. XXIV. Fig. 2.*) which is carefully passed obliquely through the upper and lower Part of the *Os spongiolum* into the Cavity of the Nose: After which they introduce and leave a small Tent in the Wound, which is frequently cleared and opened with a Probe; till being healed, it forms an artificial lacrymal Duct. Some remove the Caries, and make an artificial lacrymal Duct, at the same time, by the forementioned Instruments, or by a Director, without any actual Caustery: Which last is, however, used by some like that at *Fig. 21.* with the Tube *Fig. 22.* ^a with which the Bones are perforated, and a Passage made for the Tears into the Nose as before. Though these Methods of Cure are very troublesome and painful to the Patient, yet they are at present used as the best we are acquainted with. And St. YVES, the famous Oculist of *Paris*, treated his Patients in the same Method, as he informs us in his Treatise on *Disorders of the Eyes*.

XIV. But, in Consideration of the great Difficulty there is to persuade timorous Patients, especially those of higher Rank, to undergo the Severity and Fatigue of the forementioned Operations of Incision, boring, cauterizing, &c. ANELIUS, in the Year 1712, endeavoured to contrive a more safe and easy Method of curing these *Fistulae*, in favour of the Duke of SAVOY, who was then troubled with the Disorder. Which Method succeeded so well, as to cure not only recent, but even inveterate *Fistulae*, if not accompanied with Callus or Caries, and that even without the Severity of the Knife, Caustery, or Compression, in the following Manner.

ANELIUS's
new Method
of curing
lacrymal
Fistulae.

XV. He first provided himself with a slender Probe, in the Form of an Arch, made of small Silver-wire, as in *Tab. XVI. Fig. 11, 12, 13.* then placing the Patient in a convenient Posture against the Light, he opens the upper Eye-lid with the Fingers of one Hand, while, with those of the other, he introduces the crooked Probe through the upper *Punctum lacrymale* into the Sack; which may be done with more or less Difficulty, according as the Surgeon has before considered the Figure, or Position, and anatomical Structure of the Parts. After having introduced the Probe into the Sack, he gently agitates and presses it downwards, and towards the Nose, with a certain Slight, into the obstructed *Canalis nasalis*, which, by this Means, opened. These Ducts are much more easily opened by this Artifice, when they are only obstructed by Matter, or some glutinous Humour, than when they are totally closed and concreted, as is frequently observed in these *Fistulae* which are inveterate: For the last sometimes require the Probe to be pressed into them so forcibly, as to excite some Pain, and often set the Nose a bleeding a little ^b. But to prevent the newly-opened Duct from closing again, M. ANELE thinks it necessary to inject some Liquor every Night and Morning, or oftener; and then to repeat the Introduction of the Probe as often as it may be found necessary, till no more Matter issues from the *Puncta lacrymalia*: Which denotes the Ulcer to be cleansed, and the Ducts to have recovered their natural State.

The Use of
ANELIUS's
Probe.

^a See SOLINGENIUS, PALFYNUS, and GARENGEOT.

^b M. GARENGEOT appears to be ignorant of the Use of these Probes, when he thinks they cannot open the Ducts, but only serve to search out the lacrymal Sack. See N. XXV. following. STAHLIUS was the first, who passed the Bristle through the *Puncta lacrymalia* into the lacrymal Sack; but not with the View of opening the nasal Duct.

Use of M.
ANELIUS'S
Syringe.

XVI. To inject these Parts, I must recommend the Syringe, contrived by ANELIUS, and represented in *Tab. XVI. Fig. 14.* or else some other like it. The Tube A, in the anterior Part of this Instrument, is about the Thickness of a Hog's Bristle, and is to be inserted into the *Punctum lacrymale* of the lower Eye-lid, as being less moveable: In which Manner you force the healing Injection several Times into and through the lacrymal Sack, in order to wash out the Sordes, and render the Ducts pervious^a. To perform this Operation the more easily, your Patient ought to be placed against the Light, with his Head either erect, or a little inclined backward: And, if the Disorder be in the Right Eye, the Surgeon should stand on the Right Side of the Patient, and having filled the Syringe with a suitable Injection, he then places his left Ring-finger under the *Punctum lacrymale* of the lower Eye-lid, near the lacrymal Sack, and thereby draws down the Eye-lid, to bring the *Punctum lacrymale* into View; and thus he more easily inserts the Tube of the Syringe, and, at the same time, his Finger serves as a Fulcrum, or Support, to the others which move the Syringe. Having, in this Manner, secured the Eye-lid, the Surgeon next takes the Syringe by its Hinder-part C, betwixt the Fore and Middle-finger of his Right Hand, and carefully inserts the Tube A, in the lower End of the Syringe D, into the lower *Punctum lacrymale*: After which he presses the Handle of the Sucker B into the Syringe by the Thumb of the same Hand, so as to force the Liquor through the lacrymal Duct, Sack, and *Canalis nasalis* into the Nose; from whence it will run into the Fauces, and some Part of it will escape through the upper *Punctum lacrymale*. But to say Truth, the whole of this Method is much better and easier demonstrated by Practice, than expressed by Words. If the Disorder be in the Left Eye, the Surgeon must then stand on the Right Side of the Patient, and manage the rest of his Operation as before. If the Surgeon pleases, he may, for Variety, insert his Syringe, and inject by the upper *Punctum lacrymale*, after having turned it upward and downward by his Finger. But to inject by either of them as he ought, he should be provided with good sharp Eyes, and a dextrous Hand: Though he will find it the most easy of the two, to inject by the lower *Punctum lacrymale*.

What more
must be
done.

XVII. These two Operations of Probing and Injecting must be continued, or repeated every Day, till you find, 1. that the Injection will pass freely into the Nose without the Assistance of the Probe; and, 2. that there is no purulent Matter discharged either spontaneously, or by Pressure from the lacrymal Sack into the greater Canthus of the Eye. And then you may conclude, from these two Circumstances, that the Cure is completed: Which however is not always performed within the same time, but sooner or later according to the Nature and Degree of the Disorder. When mild, it is sometimes cured within four, eight, fourteen, or twenty Days; and sometimes longer. But there is hardly any lacrymal Fistula so bad, but it may, by this Means, be cured in Time, provided it be free from Callus and Caries. I have myself often cured these *Fistulae* in so short a Space as three Days, by this Practice: And have even found, by Experience, that this Method of ANELIUS will not prove altogether unsuccessful, even in those *Fistulae* which have a slight Caries. By this Method I cured a Girl of ten Years old, in the Year 1727, of an inveterate *Fistula lacrymalis*, with a

^a M. GARENCEOT (in *Cap. De Fist. Lacrym.*) advises the Tube of the Syringe to be agitated, till you have introduced it into the lacrymal Sack; but this is not necessary; it is sufficient you insert it into the *Punctum lacrymale*, or the Beginning of the Duct.

slight Caries, which I injected every Day for six Months: The Patient is at this Day well, and married.

XVIII. In the perfect or complete Species of the *Fistula lacrymalis*, in which the external Skin is eroded or ulcerated, you may much more easily open the Passage of the occluded nasal Canal, than in the other Kind. For in this Disorder you may readily pass the forementioned Probe of ANELIUS, immediately through the *Canalis nasalis* right down into the Nose, and that even with its largest End foremost, marked *b*, in *Fig. 12*. I have even several Times opened the nasal Canal readily in this Species of the Disorder, by the Probe marked *K*, in *Tab. I*. For detarging the Ulcer, and compleating the Cure, you must follow the Methods we have before proposed: Only instead of a Tent of Lint, you should use one of Lead or Wax, and touch the *Canalis nasalis* every other Day cautiously with a conical Bit of *Lapis infernalis*; and, after healing up the external Lips of the Wound, use the Injections adapted to keep open the nasal Canal for a considerable Time. M. PETIT has sometimes successfully used a thick waxed Thread, to keep open the nasal Canal, instead of a Tent, as we are informed by M. GARENGEOT, in his Chapter on this Disorder. But when you find the *Os Unguis* foul or vitiated, you must enlarge the Opening of your Ulcer, and remove the Caries, or perforate the Bone, as we before proposed.

Treatment
of complete
or open fistula.

XIX. In those lacrymal *Fistule*, which have no Obstruction of the nasal Canals, instead of probing, you must more frequently wash out the offending Sordes by Injection. The best Injections in this Case are of the Decoctions of vulnerary Herbs, all mineral or medicated Waters; or *Aqua Calcis*. When you perceive the lacrymal Sack too much relaxed or distended, you must endeavour to recover its Tone by topical Remedies, as *Hungary Water*, &c. And the Lips of the Wound must be touched frequently with the *Lapis infernalis*; by which the relaxed Skin will be greatly strengthened: You should also apply the compressing Instrument represented in *Tab. XVI. Fig. 20*. or some other figured for the same Purpose by AQUAPENDENS, SCULTETUS, or PALFYN.

Fistula
without Ob-
struction of
the nasal
Canal.

XX. But it must not be imagined, that the Method of probing and injecting, contrived by ANELIUS, will cure all lacrymal *Fistule* whatever. For in such as are inveterate, and attended with an obdurate Callus, or a spreading Caries, this Practice will be to no Purpose. Nor are we as yet furnished with Remedies sufficient for the Cure of such *Fistule*; though I can acquaint you, that *Archiatre* BRUNNERUS assures me in a Letter, that he cured a lacrymal *Fistula* of the very worst Kind by a mercurial Injection. It very often happens too, that the Flux of purulent Matter in this Disorder cannot be lessened, nor the nasal Canal kept open by Injection, so as to make a Passage into the Nose, even though it may seem pervious to the Probe: Of which I have known various Instances, without being able to account for the Cause. In these Cases, therefore, if the Patient presses for a Cure, there remains but one Method of relieving him, and that is, by removing the Callus and Caries, and by making a new Passage, or an artificial nasal Canal into the Nose. See N^o XII and XIII. preceding. Sometimes the Caries penetrates so far into the *Ossa spongiosa* of the Nose, that it is impossible for you to extirpate the same either by Remedies or the Cautery: Though I must confess this to be a Case that never occurred in my own Practice. But even in the very worst Cases, the Disorder may by pal-

Callous and
carious Fis-
tulæ.

liated, and the Patient much relieved, by making a Passage for the purulent Matter, to run into the Nose, which before discharged itself with great Uneasiness at the Corner of his Eye: And in these Cases too you will find Injections of the greatest Service.

Other new
Methods of
Cure.

XXI. We before observed, that, in imperfect *Fistulae*, where the Skin is not eroded, you ought first to make an Incision through the Integuments before you perforate the *Os unguis*. But, to render the Operation less formidable and severe, a certain Surgeon of *Hamburg* thought it best to perforate the Skin, Sacculus, and Bone at once, with an Instrument contrived for that Purpose, represented in *Tab. XVI. Fig. 24.* keeping open the new-formed lacrymal Ducts by a Tent, till the Wound was healed externally. Lastly, as some of the Moderns have found, that the new nasal Canal formed by perforating the *Os unguis*, does frequently fill up, or grow together, they have endeavoured to prevent it (by *WOOLHOUSE's* Direction) by inserting a small Tube of Lead, Silver, or Gold, *Tab. XVI. Fig. 25.* which is left there ever after, and the external Wound healed up over it, that the Passage may not afterwards close up. In this Practice I have several Times succeeded myself: But then I used a Tube a little larger than the common, as at *Fig. 26.* that the Tears might have a free Passage; healing up the Wound afterwards over the Tube.

LEMORIERE'S Method.

XXII. We have still another new Method of curing lacrymal *Fistulae*, proposed to the Royal Academy at *Paris*, by M. LEMORIERE^a. He first opens the lacrymal Sack in the usual Manner by a Scalpel, and then inserts a particular Kind of sharp-pointed and crooked Forceps, *Tab. XVI. Fig. 29.* A, with the Beak of which he breaks through the *Os lacrymale* into the Cavity of the Nose. In the next Place, he dilates the Perforation with the Forceps, *Fig. 30.* with which he further lacerates and breaks the *Os lacrymale*, and Membrane of the Nose, to enlarge the Ducts, so that it may not easily close up again, which it is otherwise very apt to do. After removing the Forceps, he dresses the Wound for the first Days with Lint, and some digestive Ointment: But, on the third or fourth Day, he introduces a Bit of Wax-Candle into the new-formed Duct instead of a Tent, which should be about the Thickness of a Straw, or one Line at least in Diameter, made a little crooked, and armed with a small Head, as at *Fig. 31.* A, B. This he continues in the Duct for the Space of thirty or forty Days, till the Parts are well formed; after which he removes the Candle, and heals the Wound: By which Method, he asserts, the Duct may be certainly kept open without any Danger of Concretions.

M. ST. YVES'S Method.

XXIII. We have also another Method of curing these *Fistulae*, given us by the famous Oculist ST. YVES of *Paris*, and described by SCHOBINGERUS, in a Treatise *De Fistula lacrymali Basil. Ann. 1730.* as follows: First, he gently elevates and stretches the Skin at the greater Canthus of the Eye, as in opening a Vein, and then makes an oblique Incision with a Lancet, through the Integuments, and lacrymal Sack from the Eye-lids towards the Tendon of their orbicular Muscles^b: He next dilates the Wound by inserting a Tent of prepared Sponge, and defends it with a Piece of Plaster. The next Day, after removing the Dressings,

^a In *Memoir. Acad. Reg.* An. 1729. pag. 590. Edit. *Amstel.*

^b I suppose the Incisions must be made from below upward: But it does not appear from this Description.

he examines the State of the Wound and *Os unguis* with a Probe, and by Injection; and is particularly careful in his Enquiry, whether the Bone be carious. This done, he supports the Patient's Head in a reclined Posture with one Hand, while, with the other, he cautiously and obliquely perforates the *Os unguis* towards the Nose with a triangular Probe, by the *French* called *Troicar*: In doing of which, great Care must be taken not to mistake the *Os planum* for the *Os unguis*, lest, by perforating the first, you should run into the *Antrum Highmorianum*, or else upon the *Apophysis nasalis* of the *Os maxillare*. Add to this, that when the Apex of the Trocar has entered obliquely through the *Os unguis*, you must then direct it betwixt the two *Laminae* of the *Os spongiosum* in the Middle of the Nose, that you may avoid injuring those *Laminae*, or any of the adjacent Parts. The Perforation thus made, the Surgeon now directs the Patient to breathe deep, and blow out the Air forcibly through his Nose; that by the Exit of the Air and Blood through the Wound, he may judge whether the Perforation be rightly made. To dilate and keep the Passage open, he at first inserts a Bit of Wood like a Wedge, and covers it with a Bit of Plaster. But for the same Purpose, he afterwards dresses with Tents of Lint dipt in Cerate, which Tents he renews every third Day, gradually enlarging them, but never exceeding the Thickness of a Goose-quill; and afterwards he gradually diminishes the Thickness of the Tents before the Wound is quite healed^a: By which means he asserts, that the foul Bones will cast off and separate spontaneously, without the Help either of actual or potential Caustery, and a new Passage will be formed for the Tears from the lacrymal Sack to the Nose. If any Splinters or Asperities of Bones offer themselves in the Cure, they must be removed, Sinuosities must be opened, and Ulcerations in the *Membrana Schneideriana* and lacrymal Sack deterged with *Lap. infernalis*, or other Escharotics. At every Dressing the Patient must close his Nostrils, and endeavour to force the Air through the new-formed Duct, to discharge the Sordes, and clear the Passage, which must be afterwards filled with a Tent dipt in Oil^b, and covered with a Plaster: And when the Sides of this artificial *Canalis nasalis* appear consolidated, the Tent is omitted, and the Plaster only used till the external Wound is also cicatrised, which, he says, will generally be within the Space of six or eight Weeks. And, lastly, towards the End of the Cure, when the Parts are near cicatrised, you may inject some proper Liquor through the *Punctum lacrymale*, which, by passing into the Nose, will demonstrate whether you have rightly succeeded.

XXIV. With regard to the Method of curing lacrymal *Fistulae* by Probing and Injecting, proposed by ANELIUS, SCHOBINGERUS, in pag. 22. of his Dissertation on this Subject, writes, that it is almost universally rejected, or forgot, because it requires an uncommon Dexterity or Slight in the Administration thereof. I grant, indeed, it may be rejected, or forgot, by those who are ignorant of the *Encheiresis* of the Operation, and Anatomy of the Parts. But, for my own Part, it is my general Practice, and I find no Difficulty in it: Though one would imagine, from the Description SCHOBINGERUS gives of it, that he could scarce at all perform it, not being sufficiently versed in its *Encheiresis*.

An Observation on the Method of ANELIUS.

^a I question whether it be absolutely necessary to observe all these Circumstances minutely.

^b 'Tis the general Advice of Surgeons, never to apply Oil or Fat to injured Bones: And, as I can see no Reason why it should be applied to these tender ones, I think it is safer to use a Tent dipt in *Sp. Vini rect.* or some Tincture, rather than Oil.

Some Errors
of M. GARENGEOT.

XXV. It is also remarkable, that M. GARENGEOT, in his *Operations*, passes by this Method of ANELIUS with little or no Mention of it, as a Thing of no Consequence: And, in his Treatise of *Instructions*, he describes it so lamely, that one may be satisfied he never attempted or performed it. The Probe, too, which he figures for this Operation, is so slender and weak, and so ill-shaped towards its upper End, that one can never be able to open the nasal Canal by it. He likewise represents the End of the Tube for the Syringe so slender, that it must be impossible for it to have any Perforation or Cavity as it ought; besides which, it will be apt, like a Needle to run into the Eye-lid itself instead of the Duct. Lastly, he directs to use a *Speculum Oculi*, instead of the Fingers, to secure the Eye-lids in this Operation, which *Speculum* he figures double, so that the Operator will be more obstructed than assisted by the Instrument: When the whole Business may be performed with the greatest Ease by the Fingers only, according to the Directions given by myself, and ANELIUS, for above these twenty Years past, and as I have above an hundred Times performed it. In the next Place, M. GARENGEOT writes, that the lacrymal Probe cannot be conducted into the nasal Canal, because (*“le Detour est trop grand”*) of the great Incurvation of the Passage to it; whereas the Probe may be thus conducted without Difficulty by one versed in the Artifice, and acquainted with the Course of the Ducts. And so far is the Thing from being almost impossible, as he asserts it to be, that I readily performed it above twenty Years ago, barely after the Reading of ANELIUS's Account of it, without seeing it done by another. I must indeed own, that several Surgeons have, at Times, applied themselves from *Hamburg*, and other remote Parts, to me at *Helmstadt*, to instruct them in the *Encheiressis* of this Operation, which they before thought impracticable, because they had several Times miscarried in it: But, after they had been shewn the Artifice a few Times by me, they found no Difficulty in performing it themselves. I had once a Student in Divinity under my Care for a lacrymal Fistula, who, after having seen me pass the Probe every Day for some Time through the *Punctum lacrymale* and nasal Canal into his Nose, could, upon trying, easily perform the same himself by looking in a Glass; and became, at length, so expert in it, as to pass it with more Nimbleness and Dexterity than I could myself: For by that Time you would imagine the Probe entering the lacrymal Punctum and Duct, he had slipt it also instantly through the lacrymal Sack and nasal Canal into his Nose; which Process he would repeat several Times in an Hour, without any Difficulty or Uneasiness, and there leave the Probe, to keep the Passage open. I have been the more prolix on this Artifice, to refute the Impossibility of it, and demonstrate M. GARENGEOT not only unskilled in the Operation, but even ignorant of the chief Use of the Probes which he represents, when he says, they serve only to search out the lacrymal Sack: Whereas the chief Design of them is to open the obstructed Cavity of the nasal Canal, in the watery Eye and lacrymal Fistula. Nor does the aforesaid Gentleman so much as mention the Name of ANELIUS, the Inventor of these lacrymal Probes and Syringe; for what Reason I must leave others to judge. Consult MORGAGNI, in *Adversar. Anatom.* VI. 64.

XXVI. Nor must I omit mentioning here a Method of PETIT's; which is this: He makes an Incision in the lacrymal Sack; into which he introduces a grooved Probe, passes it into the Nose, and, by this Means, opens the Canal.

Through

Through the Groove in the Probe he admits a Wax-candle (Fr. *Bougie*) to keep the Duct open. This Candle he changes once a Day, till he thinks the internal Surface of the Canal is perfectly cicatrised; and he uses it no longer. The Tears now pass, as usual, from the Eyes into the Nose, and the external Wound is closed in two or three Days. But I know by Experience, that this Method does not always succeed.

XXVII. From what has been said in this Chapter, it will manifestly appear that there are various Methods of treating lacrymal *Fistulæ*, according to different Authors, and the several Species of the Disorder: Insomuch that there is not any one Operation in Surgery besides, in which Surgeons are less uniform or more unsettled in their Practice. You will find this Disorder considered more largely, with many other different, but less considerable Methods of treating it, in our professed Dissertation *De Fistula lacrymali*, *Altorf.* 1716.

XXVIII. It now remains for me to acquaint the Reader briefly with the Methods in which I myself usually treat these *Fistulæ*. And first, in the Beginning of the milder Species, I approve of the Method of Probing and Injecting, contrived by ANELIUS: Which I usually continue for the Space of several Days or Weeks, according to the Nature of the Disorder, and especially when I perceive it diminish by this Practice. But when I find little Benefit result from it, I have Recourse to the Knife, with which I carefully lay open the Skin and lacrymal Sack, by an oblique or semi-lunar Incision; then waiting till the Hæmorrhage ceases, the next Day I perforate the *Os unguis* into the Nose, by the Instrument for this Purpose in *Tab. XVI. Fig. 24.* or *Tab. XXIV. Fig. 2.* In performing which, I observe the several necessary Circumstances, as I have before directed. After washing the Wound with warm Wine, I first fill the new-formed Duct with a Tent, and a Day or two after with a Piece of Wax-candle, or a Leaden Plummit, about the Thickness of the Instrument at *Fig. 21. A*, dipped in some Balsam or some mineral Water, till the Canal is completely formed; to effect which the sooner, I now and then touch the Surface with a Stick of *Lap. infernal.* after the Tent or Candle is extracted: And in this Method I continue three or four Weeks, or longer. I next insert a small Canula of Lead, Silver, or Gold, *Tab. XVI. Fig. 25.* from PLATNERUS, and heal up the Wound over it: But as the Bore of that Canula often proves too small to transmit the viscid Juices of these Parts freely into the Nose, I generally prefer one that is a little larger, as at *Fig. 26.* which I insert, and heal up the Wound over it as before. The Tube thus left in the new-formed nasal Canal, is generally so far from being uneasy to the Patient, that I have known many who could not tell whether the Tube was left in or not, after their Cure was completed. But to prevent any Obstructions, or other Accidents, towards the End of the Cure, the Day after I have closed the Lips of the Wound, I inject some *Decoct. Veronicæ* (or some mineral Water) several times every Day through the *Puncta lacrymalia* by the Syringe of ANELIUS, that the Tears may have a clear Passage to the Tube. I must indeed confess, that though these Tubes will generally very well suffice to convey the Humours into the Nose, yet, in some malignant *Fistulæ*, when the Tubes are not large, they do not answer their Intention, but leave the Patient molested with a watery Eye. I never yet used the actual Caution for the Cure of these *Fistulæ*, and I really think it is hardly ever necessary, notwithstanding many Authors lay so great a Stress upon it. But on the contrary

contray, I imagine the Basis of the Cure to consist in making an artificial nasal Canal sufficiently large, by the Method here prescribed; so that it may not easily be again closed or obstructed. Even if you meet with a Caries in the *Os unguis*, it may be very well removed without the actual Cautery. And lastly, you may from hence conclude, those perforating Instruments and *Canule*, which are too small to make an ample Passage through the *Os unguis* into the Nose, not well adapted to succeed in this Operation.

Cautions.

XXIX. I think it will not be improper to close this Chapter, by giving the young Surgeon a few Cautions with regard to our present Subject. And first, it will be necessary for him to keep the Patient's Body open with lenient Purges, especially when he is to call in the Assistance of the Knife; not neglecting to open a Vein in plethoric Subjects, and to repeat it upon the Approach of inflammatory Symptoms after the Operation. 2. In Patients of an ill Habit, afflicted with these *Fistulae*, the Juices must be corrected by the Use of alternate and evacuating Medicines before and after the Operation, especially a Decoction of the Woods, and a mercurial Purge now and then. (3.) If the lacrymal Fistula be attended with some other Disorder, a Regard must be had to treat the latter with proper Medicines separately. (4.) With regard to the Surgeon's Posture for performing this Operation, I usually do it standing: But PLATNERUS performs it sitting, almost in the Manner of couching a Cataract. *Diff. de Fist. lacrym.* pag. 41. (5.) The same Author directs (pag. 43.) to remove the *Periosteum* from the Bone in this Operation, also to divide and extirpate the lacrymal Sack by a transverse Incision, after separating it from the *Os unguis*. But as I can see no Reason for this Practice, I never came into it, and yet I cured my Patients equally well: And therefore of two Evils, the least is to be chosen. (6.) In order to cure the *Hernia* of the lacrymal Sack, PLATNERUS advises to open it with the Scalpel, and afterwards to heal it with *Bals. de Mecha*, that the Sack may be contracted, and rendered firmer by the Cicatrix. I myself have succeeded in this Practice: But then, a few Days after the Incision, I touched the Lips of the Wound every Day with *Lapis infernalis*, and injected afterwards a Decoction of *Veronica cum pauxillo Sp. Vini*. (7.) In a Caries of the *Os unguis*, PLATNERUS advises not to perforate it, but to burn it through into the Nose by the actual Cautery, according to the antient Practice. But as this severe Practice is not attended with any Advantage, and as the Caries of the Bone may be removed by perforating it without Fire, I prefer the milder Method. (8.) In cutting these *Fistulae*, M. GARENGEOT advises to divide the *obliquus inferior* Muscle of the Eye, if it appears bare of its Fat: But as he gives no Reason for this Practice, which may be followed with dangerous Consequences to the Eye, I think it ought to be rejected. (9.) The same Author asserts, that the new Perforation into the Nose cannot be kept open, and that therefore the Tears will not have a Passage thither after the Operation: Also, that the *Puncta lacrymalia* will be useless after the Operation. But, if this be compared with what has been here advanced, and tried by the Experience of myself and others, the Reader must naturally conclude that Gentleman to be but little versed in Disorders of the Eyes, which is also proved from his not mentioning what has been proposed on this Subject by ST. YVES, WOOLHOUSE, and LEMORIERE.



An EXPLANATION of the SIXTEENTH PLATE.

Fig. 1. Represents an obtuse pointed Hook, to draw the Eye-lids asunder in some Operations: It was sent me under the *French Name Hameçon plat*, or the flat Hook. A is the flat End; B the Handle.

Fig. 2. Represents the Needle A, fixed in a Handle B, for elevating and dissecting the small Blood-vessels on the *Conjunctiva* and White of the Eye; as also to elevate and dissect a *Pterygium*.

Fig. 3. Denotes a Beard of Rye or Barley, to make the Brush or Scarificator: In which A denotes the small Hooks and Points which scarify the Blood-vessels of the Eye.

Fig. 4. Is an Eye-brush composed of twelve or fifteen of the foregoing Beards: A the Handle; B the Part which scarifies.

Fig. 5. Is the Eye-rasp of CELSUS and AEGINETA, made in Shape almost like a Spoon: A the Handle; B the rough and convex Part, with which the Antients scarified the Eye-lids. This I received from M. MAUCHART. We have another a little different from this represented by PLATNERUS, in *Dissert. de Scarif. Oculor.*

Fig. 6. Represents the Left Eye: Whose two *Puncta lacrymalia* are denoted by *a a*, and the lacrymal Caruncle betwixt them is marked *b*.

Fig. 7 and 8. Exhibit a View of the lacrymal Ducts, as they pass from each Eye into the Nose: *a a* the lacrymal Sack; *b b* the *Puncta lacrymalia*; *c c* the Ducts which lead from the two *Puncta* into the Sack; *d d* the nasal Canal; *e e* the Opening of the same Canal into the Nose.

Fig. 9. Shews the Manner in which the before-described Ducts are situated and disposed with regard to the Eye: *a a* the *Puncta lacrymalia*; *b* the lacrymal Caruncle; *c c* the Ducts which lead from the *Puncta* to the lacrymal Sack: *d* the said Sacculus; *e* the *Canalis nasalis*; *f* the Aperture of it into the Nose.

Fig. 10. Shews an *Anchylops*, and a *Hernia* or Distension of the lacrymal Sack.

Fig. 11. Is a very slender Probe of Silver Wire, a little crooked, and armed with a small Head or round Point, for opening and clearing the lacrymal Ducts and nasal Canal, when they are obstructed in *Fistulae*, or a watery Eye, as proposed by ANELIUS.

Fig. 12. Is another Probe of the same Kind, and for the same Use, but stronger; which I use in more obdurate Obstructions of these Parts.

Fig. 13. Is another Kind of Probe, which I now use for the same Intentions, but more conveniently, as it is shorter.

Fig. 14. Is a small Silver Syringe, as described by ANELIUS, to inject Liquors through the *Puncta lacrymalia*: A the Tube which enters the lacrymal *Punctum* and Duct; B the Handle of the Sucker; C, D, the hollow Cylinder.

Fig. 15. Is another small Tube of a different Make, which may be adapted to the End of the Syringe by the Screw B.

Fig. 16 and 17. Demonstrate the several Ways in which the lacrymal Sack may be distended or relaxed.

Fig. 18.

Fig. 18. Shews how an Abscess or Tubercle may be formed, so as to destroy the lacrymal Duct; *a* that upon the upper Duct, *b* one upon the lower Duct, like that which I saw in the Duke of SAVOY.

Fig. 19. Represents a complete lacrymal Fistula: *a* one with a pretty large Opening; *b* one with a narrow Opening; the Line *bc* denotes the Course for Incision in these *Fistulae*.

Fig. 20. Is a Steel Instrument for compressing the lacrymal Sack, from PLATNERUS: A the Bolster which is imposed on the lacrymal Sack; B the Hinge; C the Screw which presses the Bolster on the Sack; D the upper Part which goes over the Forehead; E a Hook which goes into the Holes of the Strop, to secure the whole upon the Head.

Fig. 21. Is an Iron Cautery, for perforating the *Os lacrymale*.

Fig. 22. A Canula adapted to the preceding Cautery, to be fixed upon the Bone before the Cautery is applied.

Fig. 23. Represents an Instrument made of Silver or Brass: Which in the Part marked *a* is made hollow like a Spoon, to cover and secure the Eye, while the Cautery is passed through the Aperture *b* to the carious Bone; *c* the Part which serves for a Handle. This may also serve to cover the Eye when you cut for the *Fistula lacrymalis*.

Fig. 24. Represents an Instrument for perforating the Integuments, lacrymal Sack, and Bone, at the same time; or you may only perforate the Bone with it, after the lacrymal Sack is opened by Incision. A the Point; B the Handle.

Fig. 25. A B denote small Tubes to be inserted into the Perforation of the *Os unguis*, according to WOOLHOUSE and PLATNERUS, and to heal up the Wound over it.

Fig. 26. Is a Tube of the same Kind, but a little larger; which I use for the same Purpose, and may be best made of Lead or Gold.

Fig. 27, 28. Are Silver Tubes used by PLATNERUS, to keep open the new-made Passage to the Nose, till it is become callous or cicatrised.

Fig. 29. Represents the Forceps of LEMORIERE: A the sharp-pointed and crooked Beak, which perforates the *Os unguis*; B B its Handles, by which you open and shut its Beak.

Fig. 30. Represents the Head only of the same Forceps, opened as it is when you dilate the Parts, after perforating the *Os lacrymale*.

Fig. 31. Denotes the Shape of the Piece of Wax-candle, which LEMORIERE uses instead of a Tent, to keep open the Perforation to the Nose: A its Head; B that End which goes into the Nose.

Of OPERATIONS on the EYES.

C H A P. LVI^a.

Of SUFFUSIONS or CATARACTS.

I. **A**FTER having considered the Disorders of the Parts adjacent, we come now to those of the Eye itself: The chief of which is that termed a *Suffusion* by the Antients, and a *Cataract* by the Moderns. The *Greeks* call it *Hypochyma* and *Hypochysis*; the Description of which Disorder has been very imperfect, till of late. We describe a Cataract or Suffusion, with the generality of Oculists, to be a Disorder of the Humours in the Eye; by which the *Pupilla*, which ought to appear transparent and black, looks opaque, and of some other Colour, as inclining to white, grey, blue, brown, &c. And thus Vision is variously impeded; or totally destroyed.

A Cataract described.

II. It is remarkable that the generality, and even the most eminent Surgeons and Physicians, have been all along greatly deceived, till within the present Century, both as to the Seat and Causes of the Cataract. Most of them believed it to be a Pellicle, or membranous Substance, formed always in the aqueous Humour. Whereas the most expert Surgeons and Oculists have of late Years found, that, by repeated Dissections of the Eye thus disordered, there is hardly ever any white Membrane or other foreign Substance to be found in the aqueous Humour; but that it is almost constantly an Opacity in the crystalline Lens; and therefore the true and common Cause of a Cataract is, according to myself and the rest of the Moderns, an Opacity of the Crystalline, and not any thing in the aqueous Humour, as the Antients supposed. Indeed the Antients might have been led into this Error very easily, from the Appearance which the Disorder affords, without dissecting the Eye: For, by barely inspecting that diseased Organ, the opaque Crystalline looks like a Membrane in the aqueous Humour; by couching or depressing which, with a proper Instrument, the Eye recovers its former Vision. This is confirmed by various Observations and Experiments made by several eminent Members of the Royal Society at *London* and *Paris*, and the *Commerc. Literar. Norimberg.*; and may be seen, considered more at large, in our professed Treatise *De Cataracta*,

Causes according to the Antients.

* M. GARENCEOT here is much to be commended; that is, his Treatise of *Chirurg. Instruments*, Tom. I. Cap. XIV. p. 414. He laments and inveighs against the Negligence of Surgeons in leaving the Operations on the Eye wholly to Mountebanks and Strollers: And exhorts them earnestly to vindicate this most noble Branch of Surgery to themselves (though at present few are furnished even with proper Instruments) and to bestow due Pains and Attention upon it. Yet I cannot but wonder, that amongst all his *Chirurgical Operations*, this very Gentleman should describe in his Writings, or point out to his Pupils, but one relating to the Eye: Which is the Operation performed in the *Fistula lacrymalis*. This confirms me in what I hinted in the foregoing Chapter, that he was not very conversant in the Cure of these Disorders.

Glaucomate, & Amaurosi, An. 1713. and in our Apology for, and our Vindication of, the same, *An. 1717 and 1719^a.*

The first Discoveries of the true Cause.

III. It is almost eighty Years since the preceding Error of the Antients, with regard to the Cause of Cataracts, began to be publicly remarked by M. QUARE, ROLFINCKIUS, GASSENDUS, RAUHAULT, BORELLI, and others. But these Gentlemen having but few Observations to establish their truer Notion of the Disorder, their Observations were not only thought, by the generality, to be anomalous, but even the old Error, of Cataracts being constantly formed by a Membrane, still prevailed; and the rather, because there were few or none who took the Pains to dissect any Eyes affected with this Disease. But at length M. BRISAC and MAITRE-JEAN, by new Experiments and Dissections of Eyes thus affected, demonstrated apparently, that Cataracts arose not from any Membrane, but an Opacity of the crystalline Lens^b. But though these last Gentlemen were much mistaken, in thinking themselves the first Proposers of this Discovery; yet their Merit is not inconsiderable, for having more carefully proved, and demonstrated by incontestable Observations and Experiments, what had been started by their Predecessors, and at that Time almost buried again in Oblivion. For, to say nothing of myself, the whole Drift of the Essays and Observations on this Subject, given us by the Learned in *France, England, and Italy*, tends largely to prove, that the ordinary and *most common Cause* of Cataracts is from an Opacity of the crystalline Lens.

The Author's Opinion.

IV. I say only the most common Cause of Cataracts is from an Opacity of the Crystalline; without absolutely denying, as some do^c, that a membranous Substance may be sometimes formed in the Eye, so as to cause the like Disorder. I rather recommend this Point to be decided by further Observation and Experiments. For though when I first wrote on the Cataract I was furnished with five Observations of my own, besides those of BRISAC and MAITRE-JEAN, in which an Opacity of the Crystalline appeared to be the sole Cause; yet I even then entertained an Opinion, and afterwards declared it, that I thought a Membrane, or other solid Body, floating in the aqueous Humour, might sometimes also cause a Cataract, as I once observed in dissecting a recent Subject. Nor has this Caution of mine turned out useless to others, since I received a Letter from Professor WIDEMANNUS, Director of the *Acad. Natur. Curios.* which assures me, he found and demonstrated such a Membrane to several eminent Physicians of *Norimberg*, as LOCHNER, THOMAS, and GÖCKELIUS, in both the Eyes of a Woman who had Cataracts: But then he at the same time observed in one Part of the Crystalline an incipient, and in the other Part a complete Opacity: After the Operation, which was performed three Years before the Woman died, she became quite blind of that Eye whose Crystalline was wholly opaque; and with the other Eye, whose Crystalline began to be obscured, she could only discern and distinguish large Objects. A Case much like this LANCIST tells

^a PLATNER, a Pupil and Friend of WOOLHOUSE (in *Program. Anatom. 1736.* relates, that in the Eye of a Female Patient who had a Cataract) he found no Pellicle or membranous Substance; but the Crystalline Lens was opaque, and less than usual. So that even WOOLHOUSE's Pupils agree with me, that this Disorder is not properly called a *Glaucoma*, but a *Suffusion*.

^b This is the Opinion received and defended by the present *English Oculist*, TAYLOR, in his Pamphlet on the Cataract, *Lond. An. 1736.*

^c Among these I am reckoned as one by TAYLOR, in *Page 5.* of his said Pamphlet; but unjustly, since my Writings on the Subject demonstrate the contrary.

me he observed in GARELLI, *Archiatr* to the Emperor, upon dissecting whose Eyes he found a whitish Membrane in each, floating in the aqueous Humours: But then here again the Crystallines were yellowish and something obscure, though his Eyes had never undergone any Operation while he lived. Thus these Membranes seem generally attended with a Disorder of the Crystalline. From these and a few of the like Observations, it appears, that a Cataract may sometimes be caused by a Membrane in the aqueous Humour, though generally and most frequently from an Opacity of the crystalline Lens.

V. Though an Opacity of the crystalline Lens appears, from Observation and Experiment, to be the common and most frequent Cause of Cataracts; yet it has been denied by several^a, many of which have no other Reason to offer, than that they think it very extraordinary, and almost impossible, that so many eminent Physicians, and professed Oculists, should have been thus mistaken, for so many Ages, in judging it to proceed from a Membrane. Others think the Method of curing this Disorder, by couching or depressing the crystalline Lens, is so severe and dangerous an Operation, that it must inevitably destroy the whole Sight of the Eye, because they judge the Crystalline to be absolutely necessary for Vision. But how egregiously these are mistaken, may appear from the single Instance of the expert Anatomist WENCKERUS: Who found both the Crystallines at the Bottom of the Eyes many Years after he had couched; the Patient, in the mean time, enjoying his Sight very well, especially with one Eye, even to his Death, when they were dissected. A like Observation we have, given us by BENEVOLE, first separately, *Florent. Anno 1722*, and afterwards joined to a Treatise *De Caruncula in Urethra*: To which add the several Experiments made by the *French*, mentioned long ago in my Treatise on the Cataract. There are some again who, being fond of cavilling about Words, contend that such an Opacity of the Crystalline ought rather to be called a *Glaucoma* than a Cataract; but with no more Reason on their Side than the former. This Disorder of the crystalline Lens affords the same diagnostic Symptoms, and is cured by the same Practice with what has all along obtained among the Antients in their Suffusion or Cataract: And therefore this Disorder really is, or at least deserves the Name of their Cataract. On the contrary, we find that a *Glaucoma* is all along described by the most expert Surgeons and Physicians, as a Disease which very seldom happens, and which is wholly incurable. There are other frivolous Objections started, which the Reader may see refuted more at large in our Treatise on the Subject, with the Apology for the Vindication of it. We therefore assert, that a Cataract is hardly ever caused by any Membrane, or other Body floating in the aqueous Humour: Because it appears from Experience, that out of fifteen Patients, you shall hardly find one Cataract caused by a Membrane, all the rest proceeding from an Opacity in the crystalline Lens. And consequently we may depend on what has been advanced by the most expert Sur-

Asserters of
membranous
Cataracts
refuted.

^a We have a Dissertation *De Cataracta*, published in 1721, at *Strasburg*, by FREYTAGIUS; in which he asserts the general Cause of Cataracts to be a Membrane in the aqueous Humour; but, instead of proving it anatomically, he would persuade us, he had seen his Father extract such Membranes with a Hook above an hundred Times: But few will believe him, who know any thing of the Disorder, and what has been advanced concerning it by others.

geons in *France*^a, *England*^b, and *Italy*^c, viz. that the common Cause of Cataracts is not any Membrane, but an Opacity of the Crystalline, notwithstanding what others may say to the contrary.

Diagnosis.

VI. From what has been said, it will be no difficult Matter to distinguish a Cataract from the rest of the Disorders of the same Organ. For, 1. it differs from an Amaurosis, or *Gutta Seneca*, which some call the black Cataract: Because in this last the Eye loses the Sight without any visible Disorder in the Eye, or any Change in the Appearance of its Pupilla. 2. An *Albugo*, or white Speck in the Eye, is not behind the Cornea and Uvea, as is the Cataract, but in the Cornea itself. 3. The *Ungula*, or *Pterygium*, is a preternatural Tunic without-side the Cornea. 4. The *Hypopium* is indeed seated behind the Cornea in the aqueous Humour; but then it consists of a purulent and fluctuating Matter: Whereas the Cataract is a solid Substance. 5. A *Glaucoma* does indeed appear in a great measure like a Cataract, so as to deceive many, if they do not consider that though both of them are seated behind the Pupilla, yet the *Glaucoma* being in the vitreous Humour, lies deeper than the Cataract, whose Seat is in the Crystalline: Therefore the first will generally appear of a darker blue, or a grey Colour, as its Name imports: Whereas the Cataract usually appears of a Pearl Colour, and seated immediately behind the Pupilla: Add to this, that it has been constantly observed by Physicians, that the *Glaucoma* very rarely happens in Comparison with the Cataract: And when once it is formed, there is no Possibility of removing it, which cannot be said of the opaque Crystalline.

Species of Cataracts.

VII. Cataracts have been distinguished by Surgeons and Oculists into various Species. As, 1. By the Time of their standing, into *recent* and *inveterate*. 2. By their Growth, into *incipient* and *confirmed*. 3. Into *mature*, when the Pupilla is totally obstructed; and *immature*, when the Pupilla being but partly obscured, the Patient is as yet capable of perceiving Objects. Some Cataracts never come to Maturity, or at least but very slowly. 4. According to the Symptoms, Cataracts are again distinguished into *simple* and *complicated*: The latter being when the Cornea, Uvea, or vitreous Humour are also affected, or when the Pupilla is immoveable, too much contracted, or adheres to the adjacent Parts. Sometimes there is a *Tabes* of the Eye attending it; and at other Times it is joined with some Disorder of the Retina, or optic Nerve. 5. Cataracts are generally immoveable, but sometimes they tremble or fluctuate upon touching the Eye with the Finger, being then called a *shaking Cataract*. 6. Almost all of them are of different Shades, though they approach nearly to the same Colour, to wit, that of Pearl, whitish, or grey, and are accordingly denominated *white* or *grey Cataracts*. We do not frequently meet with Cataracts of a yellow or greenish Colour, and seldom with any marbled, or looking like Cheete, or like a glowing Iron. 7. In some Cataracts the crystalline Lens degenerates into a milky Fluid, and in others into a purulent Matter, like that of Abscesses: And in couching these, the Matter will escape, and confuse the Humours of the Eye upon breaking the Capsule of the Crystalline with the Needle. And hence again we have a Distinction of Cataracts into *milky* and

^a M. PETIT and MORAND, in *Hist. Acad. Reg. An. 1722, 1723.* and ST. YVES of Paris, in his Book on *Diseases of the Eyes*, Chap. on the Cataract.

^b Mr. CHESelden, and others, in *Phil. Transact.*

^c As MORGAGNI, SANTORINI, COCCHUS, BENEVOLUS, &c.

purulent.

purulent. 8. Cataracts are again usually distinguished by Oculists into *true* and *spurious*: By the first, we mean one in which the Opacity appears immediately behind the Pupilla; but the spurious is, when the Opacity seems to be seated otherwise. Lastly, 9. Cataracts are not undeservedly distinguished into curable and incurable: For those of a grey or whitish Colour are the most easily cured. To these we may add such as have no Colour, the Patient being sensible of Light and Darkness: Also those, in which the Pupil does not adhere, but can contract and dilate itself. On the contrary, you can have no great Hopes of curing complicated or fluctuating Cataracts, in which the Patient can neither perceive Light nor Darkness, and in which the Pupilla or Uvea adheres, is immoveable, and either contracted or dilated; or when it appears of the unusual Colours at 6. and 7. preceding. We find some again distinguishing Cataracts into *common* and *uncommon*. By the first, they intend such Opacities of the Crystalline as appear of a whitish Colour; and by the last, they mean those of any other Colour: Which indeed differ very remarkably from the former, in appearing not convex, like them, but flat or convave, as we have lately observed some, and as I find it also remarked by the accurate Oculist M. St. YVES, in his Treatise on the Diseases of this Organ.

VIII. We before demonstrated, that the common and usual Cause of Cataracts is an Opacity of the crystalline Lens, and hardly ever a loose Membrane. But to explain the Manner in which the Crystalline becomes thus obscured, we must consider, that when the Juices are too thick and glutinous to pass freely through the very minute serous Vessels of this Body, they stagnate and obstruct those Vessels, which become afterwards contracted and dried. Thus it may be formed in various inflammatory Disorders of the Head and Eyes; and particularly after some external Violence has injured that Organ, as a Fall, Blow, Burn, &c. or exposing the Eyes too much to the Heat of the Summer Sun, or an intense Fire.

IX. The principal Sign of a Cataract is, therefore, a small Cloud, or whitish Opacity of the Crystalline. To satisfy your Patient whether it may be cured by couching, you ought to be first well assured, whether it be of the mature or immature Kind: For if it be of the latter, the Operation will be absolutely mischievous. The Signs of a *mature* Cataract, fit for couching, are, when the Pupil having lost its native Blackness appears moveable, and equally of a dusky Hue, the Patient being sensible of Light and Darkness, but incapable of distinguishing Colours. On the contrary, you may judge it to be *immature*, if the Opacity is not equally spread behind the Pupil, the Patient being as yet able to see Objects imperfectly, especially upon turning his Back to the Light. But, if the Patient can neither discern Light nor Darkness, it is a Sign the Retina or optic Nerve is greatly affected, and that the Disorder is an *Amaurosis*, or *Gutta Serena*, for which no Cure can well be expected. You may also discover whether the Pupil adheres to the Cataract, and is become rigid, by observing whether it contracts or dilates itself in a strong Light, or in the Dark; also if it does not move upon rubbing or touching the Eye with your Finger. If any small Specks appear behind the Pupil, some Parts of the Crystalline are either inspissated, or else some minute Pellicles are sprouting from the Uvea, as I remember to have seen, and which may possibly unite into a Membrane. Sometimes only the Middle, the Margin, or else one half of the Crystalline is become opaque; and

in the first Case, Objects will seem to the Patient to be perforated in the Middle. If any Tunic appears plain or convex within-side the Pupil, it denotes the Surface of the Cataract, as ST. YVES observes.

Prognosis.

X. There is scarce any Disorder, the Event of which is more uncertain than that of the Cataract: Which will sometimes admit of a Cure, and sometimes not. But, to say the Truth, Medicines will generally have little or no Effect, when the Disorder is confirmed or inveterate; notwithstanding what some may boast of their wonderful *Arcana* for this Purpose^a. Almost the sole Relief is therefore to be had from the Surgeon's Hands and Instruments. We very rarely meet with Instances of this Disorder being cured by leaving it to Nature alone. And yet, by the Operation itself, a Cataract that bids fairest for Recovery, though treated in the most judicious Method, shall frequently be the worse for it; when one that seemed to be irrecoverable, shall be cured by the same Treatment, beyond all Expectation. However, a Cataract is much milder and more tolerable to the Patient than many other Disorders which we esteem desperate and incurable: Because neither the Disease nor the Operation are usually accompanied with intense Pain, nor Hazard to the Patient's Life. But, in the general, those Cataracts are most likely to be cured, which are mature and not complicated, the Patient being capable of distinguishing Light and Darkness, and the Pupil retaining its natural and free Motion. But there can be little Hopes of succeeding in those where the Pupil is rigidly contracted, the Uvea firmly attached to the Cataract; or where the Pupil, having lost its natural round Figure, is lacerated, angular, and variously distorted. The Success of the Operation is rendered still more doubtful, if the Patient is weak, aged, or afflicted with a violent Head-ach, or when the Eye is too much shrunk up, or enlarged and swelled. The Cataract is also the worse, as it degenerates more from the Pearl Colour: For the most unusual Colours always proceed from and denote the worst Affections of the Eyes. Yet even many of these are often cured by the Operation beyond Expectation, when the Eye is free from other Disorders. For the milky and purulent Cataracts, though there is Danger of the opaque Matter mixing with the aqueous Humour in the Operation, so as to render the Success of it doubtful; yet it has been often observed by the most expert Oculists, that this Matter will subside to the Bottom of the Eye, and the Humours recover their former Clearness^b. It is indeed difficult to couch a variegated or marbled Cataract, as being too soft, and not yet arrived to a due Consistence. Therefore when this Species does not give Way to Remedies, you ought to defer the Operation till the whole Pupil appears opaque, which denotes the Cataract to be sufficiently mature. The Disorder has been judged the more difficult to cure, as it is more inveterate, by the antient Surgeons and Physicians: and yet it has been observed by some of the modern Oculists, that Cataracts, without other Disorders in the Eyes, may be often cured, though of twelve, eighteen, or even thirty Years standing, if the Eye is free from other Disorders. If the Patient cannot distinguish Light and Darkness, the Opera-

^a HOVIUS audaciously asserts (*in Lib. De circulari Humor. in Oculis Motu*, pag. 122.) that he can thus, at any Time, cure all Sorts of Cataracts, whether recent or inveterate. But, upon the strictest Enquiry into the Truth of the Matter, I can meet with no Instances of his Success.

^b See my Treatise on the Cataract, p. 255. See MAITRE-JEAN, *Lib. De Morb. Ocular. Cap. De Cataracta*.

tion will be but of little more Service than for removing the Deformity of the Eye: Because then the Cataract is accompanied with an *Amaurosis*, or *Gutta Serena*. In Infants the Operation is generally less safe, and more impracticable, than in Adults; by reason of their Impatience and Strugglings. Nor should the Operation be performed on those who have a Cough, Catarrh, Defluxions, and Vomiting, before those Disorders are first removed: Lest, by the Patient's being disturbed in the Operation by those Symptoms, his Eye might be irrecoverably injured and spoiled for the future. In those Cataracts which move or fluctuate from one Side to the other, there is generally little or no Hope of the Operation succeeding: But when the opaque Body appears before the Pupil, it may then be sometimes extracted through an Incision in the Cornea.

XI. When the Cataract appears even desperate or incurable, I think it is better to attempt to restore the Patient's Sight by the Operation, though in vain, rather than leave him to certain Blindness without using the best Means: And this the rather, because the Operation may be performed, without inducing intense Pains, or endangering the Patient's Life; which are indeed Reasons sufficient to deter most People from Lithotomy, and the more severe chirurgical Operations. When the Patient is blinded by the Cataract, he cannot be blinded again by the Operation, if it does not succeed. The less Prospect there is of curing the Disorder, the more Honour and Fame will the Operator acquire, by recovering the Patient's Sight beyond all Expectation.

Treatment of doubtful Cataracts.

XII. Surgery can be of little or no Service towards the curing of a *Gutta Serena*, as hath been hitherto universally allowed: Till of late, the *English* Oculist TAYLOR has given out, that he can cure it by an Operation. The Falsity of this, Experience has demonstrated. The Disorder we now speak of, is not seated in the anterior or middle Part of the Eye, but either in the Retina, the optic Nerve, or in the Brain itself, to which Parts no Operation can be extended. If there is any Room left to expect a Cure, it will be more reasonable to attempt it by such internal Medicines as will raise a Salivation, and purge; adding at the same time Phlebotomy, Scarification, and Setons or Issues, especially those on the coronal Suture, or in the Neck. What we have said of the *Amaurosis*, or *Gutta Serena*, holds true in a worse Degree of the *Glaucoma*: Which being an Opacity of the vitreous Humour, is universally allowed, both by the antient and modern Surgeons, to be incurable by any Operation whatever. It is remarkable, that this vitreous Humour is sometimes so much indurated, as well as discoloured, that it resembles a Cartilage; as appears from an Observation formerly communicated to me by the celebrated Anatomist and *Archiatre* LANCISI.

Of the Glaucoma and Gutta Serena.

XIII. There are chiefly two Methods of curing Cataracts: Either by couching with the Needle, or by the Use of internal and external Remedies. It is true, there are some who reject all Methods of treating Cataracts by Medicines as useless and trifling: Yet I think there are some Cases in this Disorder which ought to be recommended to the Care of the Physician. Nor are there Instances wanting, as well among the Moderns as Antients^a, of Patients, who, by the Help of Nature, assisted with Medicines, have been freed from Cataracts beyond all Expectation; especially when the Disorder is incipient, and not firmly rooted or fixed in the crystalline Lens. But leaving the Physician to direct a

The two Methods of curing Cataracts.

^a Vide CELSUS Lib. VI. Cap. 6. and the modern Writers on the Disorder.

proper Regimen and Course of Physic adapted to the Patient's Habit, Age, and other Circumstances, we shall here proceed immediately to describe the Methods of curing Cataracts chirurgically, by the Help of the Hands and convenient Instruments; of which CELIUS has treated with great Accuracy.

Surgeons advised to be diligent in learning this Operation.

XIV. But first it may be proper for us to admonish Surgeons to make themselves better acquainted with the Operation for couching Cataracts, and to be more conversant in the Practice thereof, and not to leave the Business to Quacks and itinerant Pretenders, as we have seen it done but too much of late^a. If the Practice is, as we see often, well enough executed by these boasting Pretenders, what might we not expect from the Hands of the more prudent and regular Surgeon, were he to engage more in this Practice: Which is, in reality, attended with less Danger or Hazard than the common Operation of Phlebotomy. For, in couching a Cataract, you run no Risque of wounding a Nerve, Tendon, or Artery, as you do in opening a Vein. But lest our Reader should think we are recommending the Operation, for its Easiness, to the Practice of every one, though ever so unskilful; we shall here enumerate the several necessary Qualifications for an Oculist, whom we may venture to trust in the Cure of this Disorder. 1. He must be very well versed in the anatomical Structure, and in the Functions of the several constituent Parts of the Eye, that he may avoid injuring any of them ignorantly. 2. He must be well acquainted with the best Instruments and Methods of operating, to be learned from a frequent and close Attention to the Practice of some expert Master. 3. His Mind must be intrepid, his Hand steady, and his Eye sharp and quick-sighted. 4. He should be equally ready with his Left as with his Right Hand; that he may couch the left Eye with his Right Hand, and the right Eye with his Left Hand. 5. He must have made himself previously expert in the Practice, by repeated Trials upon the Eyes of Brutes, and of dead Men, before he ventures to couch the Eyes of the Living.

The Time of Couching; and previous Preparation of the Patient.

XV. But, in order to the more successful and easy Performance of this Operation, it will be previously necessary for the Surgeon to appoint the most convenient Time, and to prepare his Patient in the best Manner, by a proper Regimen and Medicines. With regard to the first, such a Season should be chose, in which the Air is pretty temperate as to Heat and Cold, as in Spring and Autumn. The Day appointed for the Operation should especially be serene and clear, and the Hour generally in the Fournoon: Not but the Afternoon will do very well, and may be, in some Cases, preferable for weak and timorous Patients, who are usually in better Spirits after a moderate Dinner. The Apartment for couching the Patient in will be fitter as it is lighter, provided the Sun does not shine in upon you: For so strong a Light as the Sun's Rays will cause the Pupil to contract itself, so that you cannot have so large a View of the Parts and Instrument within the Eye. As for the Preparation of the Patient, he should not only observe a proper Regimen and Diet a few Days before the Operation, but he should also in that Time take some alterative and evacuating Medicines, with the Use of Phlebotomy, to prevent the Eye from being molested by intense Pain, Inflammation, Suppuration, and perhaps a Loss of the

^a It is a little extraordinary, that M. GARENGEOT should take no Notice of this Operation in his Treatise, as if it made no Part of Surgery.

whole, after the Operation has been performed^a. It may also be generally convenient to give the Patient a Clyster, if he has not eased himself lately. And, that his Courage may not fail him, the Operator should take Care that he may have some Gravy-Soop, or other strengthening Suppings in the Morning, before he begins his Operation. Lastly, nothing can more conduce to the Patient's Recovery, and the Prevention of Accidents, after the Operation, than to procure him a sound Sleep afterwards by an Anodyne Draught or Emulsion; by which the Faculties both of his Body and Mind will be recruited, and the lately suppressed Cataract will not be apt to ascend again.

XVI. The Surgeon ought never to undertake the Operation by himself, but to provide two Assistants, one to hold the Patient's Head (as in *Tab. XVII. Fig. 1. A.*) and the other, to administer the Needle and other Necessaries. But he must be more particularly provided with *couching Needles*, and with a *Speculum Oculi*. Of the *Speculum* you have two Forms at *Fig. 15* and *16*. and of the couching Needles there are a great many Kinds, the chief of which are represented in *Tab. XVII. Fig. 2, 3, 4, 5, 6, 7, 8, 9, 10* and *11*. The best of them are, in my Judgment, those at *Fig. 5, 6*, and *10*. All have a little broad and sharp Point like a Tongue or like a Barley-corn, but flatter: And that at *Fig. 6*. with a Sulcus in its Point, seems better adapted to couch the Cataract, than any of those which have either a narrower or a broader Point. For those with too slender a Point, as in *Fig. 2* and *4*. do easily lacerate the Cataract: And those with a more obtuse Point, as in *Fig. 8*. meet with Difficulty in perforating the Coats of the Eye. For these Reasons many Surgeons use two Needles in this Operation, one with a sharp Point, (*Fig. 7* and *9*.) to perforate the Coats of the Eye, and the other with a broader or more obtuse Point (*Fig. 8*.) to depress or couch the opaque crystalline Lens. But it is much easier to write of the Advantage of using two Needles, than to experience it in Practice. But which ever Sort you chuse, Care must be taken, that it be first well polished with Cloth or Leather, before you use it to the Eye; that neither its Roughness, nor any Particles of Rust, may injure that very tender Organ. Mr. FREYTAG beforementioned greatly recommends a Needle shaped like a Hook, for extracting membranous Cataracts out of the Eye: But if this succeeds so well, why did he not give us the Figure of it?

Of the Assistants and Needles.

XVII. That there may be no Obstruction, nor any Time lost in the Operation, it will be necessary to provide every thing in Order which may be wanted for the Dressings, after the Couching is performed. Such as, 1. a cooling Collyrium *ex Aq. Plantag. cum Ovi alb. subact. & cum Aluminis, vel Tutie, vel Croci, aut Camphoræ portiuncula*. Others use common *Sp. Vini* for a Collyrium. ST. YVES uses a Mixture of ten Parts Water, and one *Sp. Vini*, which he recommends as the best. 2. A large Compress of soft Linen, sufficient to cover the diseased Eye. 3. A Bandage of about three Ells long, and two Fingers broad; or else an Handkerchief folded together in Form of a Triangle, to retain the Compress and Dressings on the Eye. Lastly, 4. you must provide some *Aq. Reg. Hungar. vel Acetum, vel Sp. Cl. &c.* to rub the Patient's Nostrils, if he should faint in, or soon after the Operation.

Apparatus of Dressings described.

^a Such a Case as this is described by my Son, in his Account of the Operation for a Cataract, performed by TAYLOR at Amsterdam, in 1735, upon one of our Friends.

Position of
the Patient.

XVIII. There now remains but one more Pre-requisite before the Surgeon enters on his Work: And that is, to fix and secure the Patient in the most convenient and advantageous Posture. He therefore must be placed against the Light on a much lower Seat than that of the Operator, as you may see in *Tab. XVII. Fig. 1.* E. the Surgeon himself C, being seated on a much higher Chair D. If the Patient can see either perfectly, or but in Part with the Eye, which is not couched, it must be first covered or blindfolded with a Handkerchief or Bandage; lest, by seeing the Instrument approach, he should move his Eye, and disturb the Operation. Upon which Account it may be also proper to admonish the Patient, that if his Eye should recover its Sight very suddenly in the Operation, as is not unfrequent, he may not stir, or make any Exclamations of Joy till it is over: Lest, by a small irregular Motion, the whole Cure should be frustrated, and his Sight lost for ever. The Patient should fix his Hands on the Surgeon's Thighs, and his Legs also betwixt those of the Operator. Sometimes it may be proper for an Assistant to hold up his Feet, that he may not rise out of the Chair before the Operation is finished. Behind the Patient must stand the Assistant A, securing the Head, when the left Eye is to be couched, with his Left Hand on the Forehead, and his Right Hand upon the Chin, which he must press close to his Breast, so as to hold the Head firm and steady; because a very small Motion of the Head may cause perpetual Blindness, as we are assured by sad Experience.

Method of
Operating.

XIX. Every thing being thus prepared in Readiness, the Patient is ordered to open his Eye-lids as wide as possible, and to turn his Eye inwards towards his Nose, that a sufficient Portion of the White of the Eye may appear in the lesser Angle of the Orbit towards the Temple. (See *Plate XVII. Fig. 14. A.*) The Operator now divaricates the Eye-lids with the Fore-finger and Thumb of his left Hand, when it is the left Eye, and of his Right Hand when it is the right Eye he couches: And thus he at the same time firmly secures the Eye from moving: See *Fig. 1.* and *Fig. 14.* Some there are who use the *Speculum Oculi*, *Fig. 15* or *16*, for this Purpose, which, in my Opinion, will more impede than assist the Operator: But I shall not advise those to reject it, who are fond of using it. The Oculist next takes the couching Needle, handed to him by an Assistant, betwixt the Thumb, Fore and Middle-finger of his Right Hand, in the Manner we usually hold a Pen in Writing, as you may see in *Fig. 1.* and *Fig. 14.* He then places the two lower Fingers of the same Hand upon the Patient's Cheek, to support those which guide the Needle, and that they move freely, as in Writing. Then he carefully enters the Needle almost in the Middle of the White of the Eye^a betwixt the *Cornea* and external Angle of the Orbit; proceeding, not obliquely, but straight, through the Coats of the Eye, over-against the Cataract, to avoid wounding the Blood-vessels; see *Fig. 14. A.* As soon as the Needle is perceived to be through the Coats of the Eye, which may be known by your losing the Resistance, its Point is then inclined towards the Cataract; (see *Fig. 14. B.*) which being entered by the End of your Instrument, you thereby endeavour to depress it gently below the Pupil to the Fundus of

^a The true Place for perforating the Coats of the Eye by the couching Needle, has been largely and elegantly treated of in *Mem. Acad. Reg. Paris. An. 1726, pag. 37c. Edit. Amstel.* by M. PETIT, who assigns the Place to be two Lines Distance from the *Cornea*. The Place approved of by TAYLOR we shall consider hereafter.

the Eye, whether it be a Membrane or an Opacity in the crystalline Lens: For we are not as yet furnished with distinguishing Marks sufficient to know one Case from the other by their external Appearance, except the Observations of ST. YVES. If you perceive the Cataract descend with the Point of the Instrument below the Pupilla, which it will do the first Time, when mature and consistent enough, you are then to continue it there a little while, that it may afterwards stay at the Fundus of the Eye. If, upon elevating your Instrument again, the Cataract does not rise above the Pupil, your Operation is well performed: And therefore the Needle is now to be drawn out of the Eye in a straight Line as it entered. If the Cataract rises again afterwards above the Pupil, as it frequently does, you must again couch it with the same Needle, as before, keep it down a longer Time, till it remains suppressed below the Pupil. M. FREYTAGE indeed advises to extract the Cataract, which he thinks is always a Pellicle, by a Hook through the *Cornea*: As, he says, he has frequently seen done by his Father. But as he neither describes the Hook, nor the Method of Extraction, and as I much doubt whether this Hook would not also extract or lacerate the *Retina*, *Choroides* and *Sclerotica*, 'tis, in my Opinion, best to neglect his Advice.

XX. When the Cataract adheres firmly to any of the Coats of the Eye, 'tis often a very difficult Task to couch or depress it entire: And therefore in this Case you may first divide it with the Needle, and then couch or depress each Part separately. The same must be done if you happen to lacerate, or break the Cataract in Pieces in the Operation: And, by this means, the Patient has often recovered his Sight, as we read in CELSUS, GUILLEMEAU, PAREY, BARBET, BRISSAC, and as I have twice observed myself. If the Cataract adheres so firmly to the Uvea, that it can hardly be thence separated, it is often convenient to perforate it in the Middle: By which Means the Rays of Light, passing through the Perforation to the *Retina*, the Patient can sometimes see tolerably well afterwards. Which Practice may perhaps succeed best when the Crystalline is very thin: For I once found it so diminished in Thickness in a dead Subject, that it was scarce thicker than one's Thumb-nail, and firmly adhered at the same Time to the Uvea. But when the Cataract appears to be yet too soft, it is adviseable with BRISSAC, to withdraw the Needle, and defer the Operation till it becomes more consistent, rather than destroy the Patient's Sight by confusing the Humours. When both Eyes are to be couched, 'tis best not to perform the Operation on both at one Time, but to intermit a few Days, that the Patient may the better endure the same without too violent Symptoms. If you couch the right Eye, the Operation must be reversed: That is, you must hold open the Eye-lids with the Thumb and Fingers of your Right Hand, and couch the Cataract by the Needle with those of your Left; because the Vicinity of the Nose to the greater Canthus of the right Eye, will impede the Action of the right Hand for this Operation. Though in *Tab. XVII. Fig. 17.* you have the Figure of a Needle contrived and sent me by a Friend, with which you may couch the right Eye with the Right Hand. A the Needle, B the Handle, C the Incurvation which rests on the Nose.

Reflections
on the Ope-
ration.

XXI. It is a common Practice with Mountebanks and itinerant Oculists, to hold up their two Fingers extended, or else a Glass of Wine, before the Patient's Eye, as soon as the couching Needle is extracted; calling out to know

Treatment
after the O-
peration.

what the Object is, or of what Colour it appears : And if the Patient can distinguish, and answer rightly, they then conclude the Operation to have been well performed. But this is, by the more prudent Surgeons and Oculists, judged to be a pernicious Method ; because, by the Patient's straining his Eye too soon to view the Objects, the Cataract is often roused and elevated again. It is therefore much better to defend the Eye immediately after Couching with a Compress dipt in some Collyrium, and secured by a Handkerchief, that the *Retina* may not be injured by a too strong Action of the Light. It will be necessary to blind up both the Eyes, though you couched but one : Because if you leave the sound Eye uncovered, it will be perhaps looking at Objects, and will consequently draw or strain the diseased Eye in the same Direction ; which may remove the Cataract, and cause it to ascend again, or else induce an Inflammation, or other bad Accidents.

How to prevent the Cataract from rising.

XXII. After your Dressing and Deligation, the Patient should be laid on his Bed, upon his Back, with his Head elevated, and retained almost erect, by Pillows ; and continue very quiet and composed for the Space of eight Days, without coughing, sneezing, laughing, intense talking, or eating Food of a hard Digestion, in order to prevent the Cataract from rising or being disturbed. No Surgeon can assert that the Cataract shall continue suppressed after the first Time of couching : But the Patient has this Advantage, that if it ascends it may be again suppressed, and his Sight recovered by the Operation. Accordingly MAITRE-JEAN writes, that a Patient, whom he couched in Autumn, had a Return of his Cataract in the Spring following. But it was happily removed again by repeating the Operation. We have even some Instances of the Cataracts having subsided again of themselves, after they had risen above the Pupil.

Further Treatment.

XXIII. A few Hours after the Operation, it will be convenient to bleed the Patient in Proportion to his Strength and Fulness of Habit, to prevent an Inflammation in the wounded Eye ; and to repeat the same, if necessary, with the Use of *Collyria* externally, and cooling Purges internally. 'Tis very remarkable, that the Patient is often troubled with a Vomiting an Hour or two after the Operation, as I have frequently observed, and imagine to arise from the Consent of the Nerves, and their Irritation in the Operation, which soon goes off afterwards : Which I find has been also observed by Mr. FREYTAG. However, this Symptom of Vomiting is no good Presage, because the Patient's straining in this Action, often causes the Cataract to ascend. In the Evening, after the Operation, you should order the Patient an anodyne Emulsion, to compose him to Rest ; because Watchings and Restlessness very often occasion the Cataract to ascend again above the Pupil. The Diet and Regimen here must be ordered the same as we have directed in Wounds and inflammatory Disorders. Lastly, if the Patient does not go to Stool freely without straining, it will be proper to help him with a Clyster : Nor should he be permitted to disturb his Head by rising out of Bed for this Office ; but, for the first few Days after the Operation, it will be more convenient to use a Bed-pan. All which Precautions are necessary, to prevent the lately depressed Cataract from being disturbed or raised again above the Pupil.

XXIV. With regard to the Deligation and subsequent Dressings, it will be convenient to remove the Bandage very gently on the first Evening after the Operation ;

Operation; and renewing the Compress dipt in some Collyrium, to apply the Bandage again as before. On the following Days this Process must be repeated Morning and Evening at least, and sometimes four or five Times in a Day: Because the Inflammation then becomes more intense, and the Compresses dry much sooner. Therefore the Operator should, at this Time, be more solicitous to guard the Light from the Eye, especially when the Inflammation runs high. If the Eye continues in a good Condition with but a slight Inflammation, you must continue this Method of Dressing till the eighth Day, when all the Danger will be over: You may then, by Degrees, remove the Bandage, and admit the Light to the Eye, which should be for some Time guarded at first with a Piece of green Silk hanging over the Forehead. On the tenth Day, if nothing forbids, the Patient may rise and walk about his Chamber, provided his Window-curtains are drawn, and his Eyes defended with green Silk as before: Which he may, by Degrees, lay aside, and return to his former Course of Life.

XXV. That the young Surgeon may the better understand how to relieve the several Accidents which may attend this Operation, we shall consider each of them separately. And, 1. If a small Portion of Blood should be extravasated, and escape into the aqueous Humour, so as to render it in some Measure obscure and turbid, you must dispatch the Operation as fast as possible, and dress up the Eye with a Compress dipt in the forementioned Collyrium: By which Means slight Extravasations have been frequently observed to be dispersed. But if a large Quantity of Blood mixed with the aqueous Humour, it will then be almost impossible to avoid a Suppuration, termed *Hypopyum*, or other ill Consequences, which endanger perpetual Blindness, or a total Destruction of the Eye. Yet even here you will find great Benefit from plentiful Bleeding, and from discutient Bags stuffed with Fennel, Sage, Hyssop, and Rosemary, boiled in Wine, frequently to be applied warm to the Eye. 2. If the aqueous Humour itself escapes, or runs out of the Eye, in the Operation, so as to leave the *Cornea* flaccid, the Eye itself is not in any great Danger thereby: For the Humour will be reproduced so as to fill the *Cornea* again in a few Days. Lastly, 3. If great Inflammation should arise, you must omit nothing that will conduce to suppress it: As plentiful Bleeding, and drinking of Water, or other cooling and diluent Liquors, to bathe the Temples frequently with *Sp. Vini Camph.* to apply Blisters behind the Ears, and clyster the Patient as you shall see necessary.

The Removal of Accidents.

XXVI. From what has been said, I think it is sufficiently apparent how much the Moderns are improved above the Antients, as to their Knowledge of the true Nature or Diagnosis, Prognosis, and Method of curing this Disorder. For, upon observing that a Cataract was rather constantly formed by an Opacity of the CrySTALLINE, than from any Membrane, BRISSAC consequently judged, that those couching Needles would succeed best, which were made with a sulcated and pretty broad Point, as in *Tab. XVII. Fig. 6. lit. C.* For by using those slender-pointed Needles of the antient Surgeons, whether made of Gold, Silver, or Steel, it was almost impossible to avoid cutting or lacerating the Cataract in couching it. But the couching Needle of BRISSAC is made with an acuminate, as well as a broad and sulcated Point, that it might the more readily perforate the Coats of the Eye. The Handle of the couching Needle

Fabric of the couching Needle.

Needle A B is octangular; and the Side marked E E lying even with the Sulcus in its Point, is hatched, or otherwise particularly marked, that you may judge by the Position of the Handle how the Point of the Needle is directed, in respect of the Cataract in the Eye. Lastly, the rising or Protuberance of the Instrument, marked D, serves to indicate how deep it has entered into the Eye.

Other particular Needles.

XXVII. Those Surgeons who have persuaded themselves, that a Cataract proceeds from a Membrane or Tunic, have also provided themselves with an unciform Instrument, to extract the said Membrane through the Puncture made in the Coats of the Eye by the Needle, and prevent the Disorder from returning; as it might, if they were to leave the Cataract at the Bottom of the Eye. Some of their Instruments were made tubular, in order to suck out the Membrane from the Eye^a; others were made like a Pair of small Pliers in the Shape of a Needle; as in *Tab. XVII. Fig. 10.* and others again were like small Hooks which they introduced and extracted through a Canula, together with the Tunic or Cataract, according to FREYTAG. But their Methods and Instruments were as useless and mischievous as their Notion of the Disorder was false.

When the Cataract comes thro' the Pupil.

XXVIII. We have further to advise, that if the Cataract should further extend itself, or slip through the Pupil, as it sometimes may, it will then be proper to try if you can draw it back by passing the Needle through the Pupil; if not, to make a small Incision in the lower Part of the *Cornea*, and thereby extract the Cataract by a small Hook or Probe; an Instance of which Practice we have given in our professed Treatise on this Disorder.

TAYLOR'S Method.

XXIX. The noted Oculist, TAYLOR, proposes a new Method of his own, as he says, for couching Cataracts, in the ninth Chapter of his Treatise, which he describes as follows: The Patient being seated as usual, and his Eye held firm by the *Speculum Oculi*, he then makes a small longitudinal Incision with a Lancet^b of about half a Line in Length below the usual Place; which Incision he continues through the external and internal Coats of the Eye into the vitreous Humour. He then takes a *Plano-convex* Needle of a very slender or thin make, and passes it through the Incision directly into the Eye, with its convex Part upwards and towards the Bottom of the crystalline Lens. He next gently elevates the Point of his Needle a little, till he finds a small Resistance on it from the crystalline Lens above it, which he also perceives to move, by looking through the Pupil. Being thus assured the Point of his Needle is under the Capsule of the Crystalline, he then guides his Needle downward towards the Bottom of the Eye, to divide the vitreous Humour, and make a Space for receiving the Crystalline, which he next depresses. In order to couch the Crystalline, after having divided the vitreous Humour, he draws his Needle about two Lines further out of the Eye, and then inserts the Point of it into the lower Part of the Capsule of the Crystalline, which he thus incises or opens as he says, without injuring the *Ligamentum ciliare*: And in thus opening the Capsule, he also endeavours to enlarge the Space for receiving the Crystalline. Lastly, in order to couch or depress the opaque Crystalline, he again extracts his Needle almost three

^a Vid. SCHACCHI *Subsid. Medicin.* p. 54. & TH. FIENI, *Lib. Chirurg.* p. 30.

^b He does not give us any Reason for using a Lancet, or for making his Incision longitudinal rather than oblique or transverse, nor can I see any Reason for it; but it is a standing Maxim in Surgery, never to use several Instruments for what may be done as well by one.

Lines more out of the Eye: Then elevating its Point, and fixing the same into the upper Part of the Cryſtalline, he endeavours to depreſs and lodge it in the Space before made for its Reception in the vitreous Humour at the Fundus of the Eye, and then gently extracts his Needle. By this means, he aſſerts, that the *Uvea* and *Ligamentum ciliare* are not in the leaſt injured, but remain in their natural and ſound State: Whereas in the common Method of couching they are uſually lacerated, to the great Detriment of the Eye, and its Office of Viſion. To conclude, the Subſtance of his Method of operating, which we have here briefly related, is ſo ſwelled and obſcured, by ſtuffing it with frivolous Cautions and Circumſtances, in his Treatiſe, from whence we have extracted it, that it there takes up more than three Times the Compaſs in which we have here repreſented it: And yet we have omitted nothing but what was either inſignificant or unintelligible. There are even ſo many Circumſtances related, that it ſeems impoſſible the Author himſelf ſhould attend to all of them; and this may poſſibly be one Reaſon of his ill Succeſs in Practice, his Operation being followed with excruciating Pains, moſt violent Inflammation, and a Suppuration of the Eye, inſtead of recovering the Patient's Sight: As you may ſee related more at large in my Son's Treatiſe, on the unhappy couching of a Cataract in our Friend at *Amſterdam*, by TAYLOR, in 1735. However, the Practice deſerves to be conſidered and tried by the more prudent Oculiſts: And the Succeſs of it will, in Time, determine the Author's Merit.

XXX. When the Cataract moves, or when the opaque cryſtalline Lens is ſlipt out of its Capsule, and fluctuates behind the Pupil, which TAYLOR then calls a *ſhaking Cataract*; the Diſorder, he ſays, will now require a different Method of Cure: To explain which he makes the Buſineſs of two diſtinct Chapters, which import no more than that he here paſſes his Needle as before, into the Eye, directing its Point to the upper and anterior Part of the Cataract, or opaque Cryſtalline, to avoid injuring the ciliary Ligament; and then, with the plain Surface of his couching Needle, he depreſſes the ſame to the Bottom of the vitreous Humour.

His Treatment of the ſhaking Cataract.

XXXI. In ſome Cataracts, which he terms *faſe*, he ſays, the Capsule of the Cryſtalline is vitiated, and become opaque, as well as the Lens. The Method of couching both of which, and freeing them from the ciliary Ligament, is related by him in ſo prolix a Manner, that he again makes it the Buſineſs of two whole Chapters. Two other Chapters are again employed in explaining his Operation for the *Glaucoma*: By which Name he underſtands, contrary to all his Predeceſſors, an Opacity joined with an Expansion of the cryſtalline Lens, which, with its vitiated Capsule, are extended or protruded forwards cloſe to the Margin of the Pupil: For the Cure of which he proceeds in the ſame Manner as before. But I know not what Right or Authority he has, more than his own Aſſurance, to impoſe this Name to a Diſorder, different from what it has been all along intended to ſignify by our Predeceſſors. For it will appear quite unwarrantable even to make, and much more to transfer Names, without an abſolute Neceſſity. Since what he calls a *Glaucoma*, is, I think, a Species of the Cataract, and not a Diſorder of the vitreous Humour, ſeated much deeper in the Eye, as the Antients have all along underſtood by the Name.

His Treatment of the faſe Cataract and Glaucoma.

XXXII. We before obſerved, at N. XXVIII. that thoſe Cataracts which have eſcaped through the Pupil, may be extracted by an Inciſion made in the *Cornea*. But I have been aſſured from *England*, that this famous Oculiſt there boated, that

His Extraction of Cataracts thro' the Cornea.

that he could, and does extract Cataracts in this Manner, which are even fixed behind the Pupil and *Uvea*. But I could never yet learn the Truth of his Assertion, or that he ever performed the Fact.

C H A P. LVI.

Of Dilating CONTRACTIONS of the PUPIL.

Description
of the Dis-
order.

I. **W**E are now to treat of an Operation related to the foregoing, in which the Coats of the Eye are perforated by an Instrument, almost in the same Manner as in couching a Cataract, in order to open an imperforated or contracted Pupil. The Disease we are now speaking of is therefore such a total or close Contraction of the Pupil, that it will not transmit Light enough to the Bottom of the Eye, to enable the Patient to see Objects distinctly. Sometimes this Disorder has grown up from Infancy; and sometimes it arises from an intense Inflammation of the Eye, or some sudden and violent Constriction of the Pupil from other Causes, with a Palsy of the strait Fibres in the *Uvea*; or when the internal Margin of that Membrane, which constitutes the Pupil, is concreted or joined to a Cataract, or to some Part of a Cataract, after the Operation. The Cure of the Disorder is generally esteemed extremely difficult, if not altogether impracticable. But the celebrated Mr. CHESELDEN has contrived a new Method of relieving this Disorder, which he has not only tried several Times with Success, but also described his Process in the *Philosophical Transactions*, and in the *Appendix* to the fourth Edition of his Anatomy: Which we shall therefore give a Place here in our Surgery, as follows:

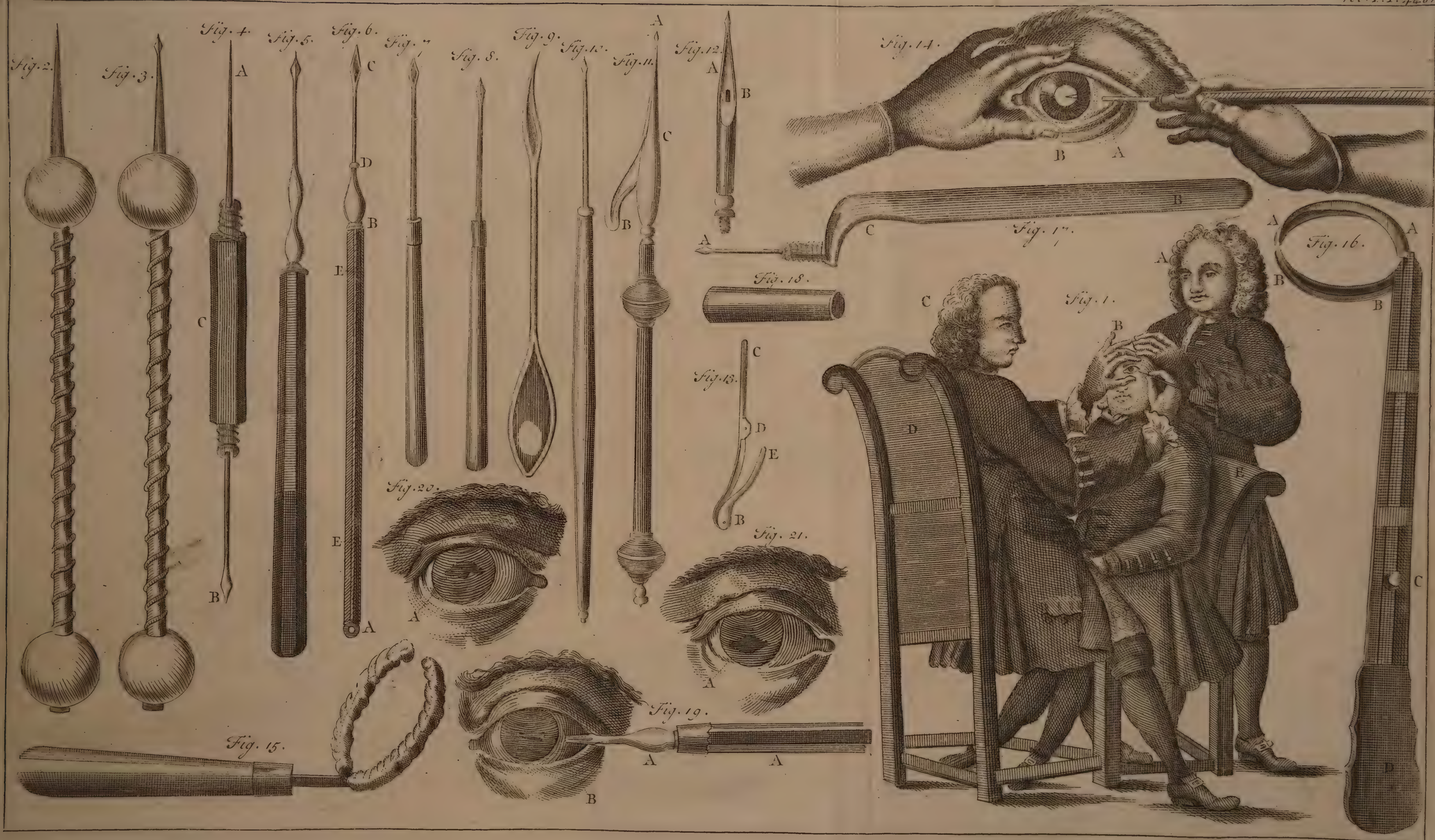
The Opera-
tion.

II. The Eye-lids being held open by a *Speculum Oculi*, he then takes a narrow and single-edged Scalpel, or Needle, *Tab. XVII. Fig. 19. AA*, almost like that for couching a Cataract; and passing it through the *Sclerotica B*, as in couching, he afterwards thrusts it forwards through the *Uvea* or *Iris*, and, in extracting it, cuts through the *Iris* in the Manner represented by *Fig. 20. A*. If the Disorder is not accompanied with a Cataract, it will be best to perforate the *Iris* in the Middle, as you may perceive by *Fig. 20*. But when there is a Cataract, the Incision should be made a little higher in the *Uvea*, that the Cataract may not obstruct the Ingress of the Rays of Light. The Cataracts which sometimes accompany this Disorder, he says, are generally very small; and sometimes their Adhesion to the *Iris* is so firm, as to render it impracticable to couch or suppress them. In *Fig. 21*. the Incision or Aperture is represented lower than the Centre of the *Cornea* and *Uvea*; because in this Eye on which he performed the Operation there was an *Albugo*, or white Speck, upon the upper Part of the *Cornea*, which obliged him to incise lower than usual. He does not indeed relate the Manner of treating the Patient afterwards, to suppress and guard against an Inflammation, and other Accidents: But 'tis reasonable to suppose you must proceed in the same Method as after the Operation for a Cataract.

An EXPLANATION of the SEVENTEENTH PLATE.

Fig. 1. Demonstrates the Position of the Patient, Surgeon, and Assistant, proper for couching a Cataract as explained in *Chap. LV. N. XVIII*.

Fig. 2, 3. Represents the Silver couching Needles used by the Antients; the first having a slender and round Point like common Needles, and the last a triangular Point. *Fig. 4.*



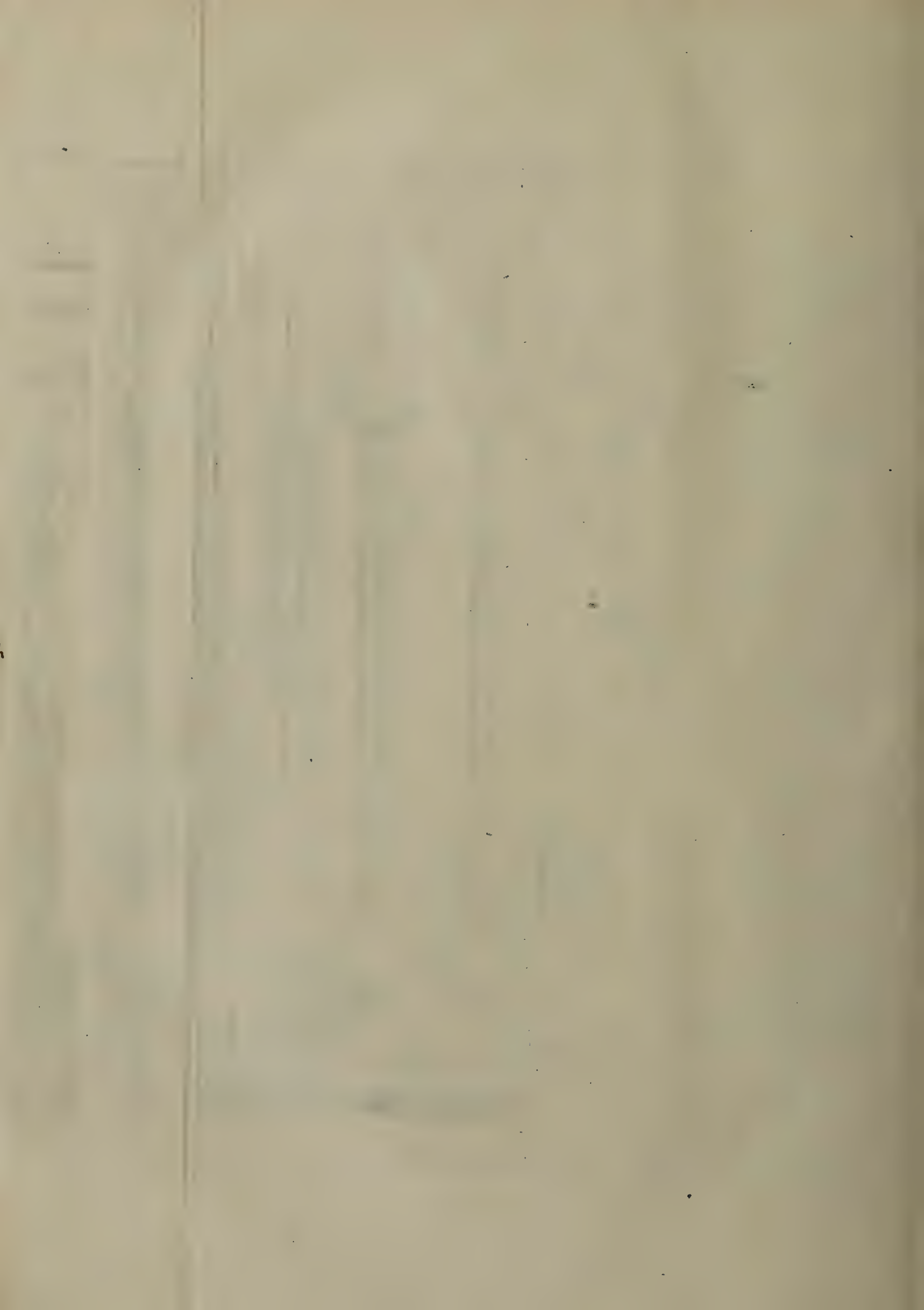


Fig. 4. Represents a double-pointed couching Needle; that marked A being round and slender, and that at B a little broader or flatter: C denotes the Handle, which may be made of Silver, Brass, Ivory or Wood.

Fig. 5. Is another Needle with a still broader Point, but sharp-edged; with which a Cataract may be more commodiously held and couched than by a smaller Point.

Fig. 6. Denotes another couching Needle, almost like the former, only furnished with a *Sulcus* in its *Apex*, which is recommended by BRISSAC, and described more largely at N^o XXVI. of *Chap. LV.*

Fig. 7, 8. Represent two Needles from SOLINGEN and NUCKE, which are said to be invented by the *Dutch* Oculist SALMASIUS, and to be both used in one and the same Operation. That at *Fig. 7.* is sulcated and sharp pointed, almost like the preceding, and serves to perforate the Coats of the Eye; from whence BRISSAC seems to have taken his at *Fig. 6.* But that at *Fig. 8.* is obtuse, and made so as to pass through the *Sulcus* of the preceding Needle, while it continues in the Eye to depress the Cataract.

Fig. 9, and 10. Represent two Needles of pretty much the same Use with the two preceding, and are taken from BERN. ALBINUS's *Disputatio de Cataracta, Francof. impress.*

Fig. 11. Denotes the Needle proposed by ALBINUS, in his said Treatise, for extracting a membranous Cataract out of the Eye; being so contrived that the Point A opens like a Pair of Pliers, to extract the membranous Cataract, (if there be any in the Eye) by depressing the little Handle B; though I much doubt whether it was ever used with Success.

Fig. 12, and 13. Represent the Parts of the preceding Needle separate and asunder. *Fig. 12.* is the sulcated Point, in which is lodged the other Point *Fig. 13.* These perforate the Eye the better, as they are more exactly fitted and polished. They are connected by the Hinge B, C, D. *Fig. 11, 12, and 13.* E. *Fig. 13.* denotes a Spring to press the two Points close together, till you open them by depressing it with your Thumb on the little Handle, B. *Fig. 11.* to apprehend and extract the Membrane.

Fig. 14. Represents the Method of holding open the Eye-lids with one Hand, and of passing the Needle with your other, for couching a Cataract, the Point B usually appearing through the Pupil.

Fig. 15, and 16. Represent two *Specula Oculorum*, to hold the Eyes firm, and open their Lids in couching, and other Operations for the Eyes: The last is more correct than the first, as you may extend or contract the Circle AA, BB, by elevating or depressing the Button C. The Handle is denoted by D.

Fig. 17. Represents a Needle for couching a Cataract in the Right Eye with the Right Hand. A the Point of the Needle; B its Handle, in which is a particular Kind of Incurvation, C to rest upon the Nose.

Fig. 18. Is a Cap or Sheath for including the Point of the same Needle:

Fig. 19. Is taken from the *Appendix* to the fourth Edition of Mr. CHESELDEN's *Anatomy*, to shew the Manner of directing his Cutting-Needle to open or incise the closed or contracted *Uvea*.

Fig. 20. Denotes the Manner of dividing the *Uvea* in its Middle by the same Instrument, to transmit the Rays of Light into the Eye.

Fig. 21. Represents the Manner in which Mr. CHESELDEN pierced the *Uvea* lower than usual, on the Account of an *Albugo*, which infested the Middle of the *Cornea* in this Eye.

C H A P. LVII.

Of the PTERYGIUM, or Unguis Oculorum.

Description. I. **W**HEN a preternatural Membrane is formed externally upon the Coats of the Eye, so as to extend itself over the *Cornea* and Pupil, and obstruct the Sight, the Disorder is then usually denominated *Onyx* by the *Greeks*, and *Unguis*, or *Ungula*, by the *Latins*; it is also sometimes named *Pterygium*, from its Resemblance to the Wing of a Bat^a. Sometimes the Pellicle or Film appears red, from the Number of small Blood-vessels, and then it is usually denominated *Pannus*. It most frequently arises in the Angles of the Eyes from the Temples or Nose, and sometimes from above or below, extending itself, by Degrees, over the *Cornea*, (as in *Tab. XVIII. Fig. 1* and *2. a a.*) Sometimes it only adheres slightly to the *Cornea* by a few slender Fibres; and sometimes again it is extended over the whole Eye, and continues most firmly and intimately attached to it, which usually renders the Case much more difficult to cure.

Cure by
Medicines.

II. While the Pellicle is but recent and slightly attached, it may be removed by gentle Escharotics; such as Powder *ex Saccar. Canariens.* 3j. *Vitrioli albi vel Aluminis usti, vel etiam viridis Aeris Gr.* iv. *vel vj.* which must be carefully sprinkled at Intervals by a little at a Time upon the Membrane. Some use a Powder of the *Lapis scissilis*, or of the *Os Sepiæ* mixed with Sugar. But as it will be difficult to use such a Powder for Infants, it will be better to treat them with an Eye-water, as that of *QUERCITAN, cum Vitriol. alb. aut felle Mustelæ piscis, &c.* which may be also used to Advantage for Adults. If the Disorder is accompanied with an Inflammation, it will be convenient for you to treat the Patient accordingly, by Bleeding, Blisters, and cooling Medicines. M. ST. YVES sets a great Value on the *Lapis medicamentosus Crollii*, dissolved in Water, and used to wash the Eye; though, in my Opinion, a Solution of *Vitriol. alb. ʒss.* in *Aqua Chelidonii major.* 3 ij. is little inferior, if at all.

Cure by the
Scalpel.

III. If the mild Escharotics, before proposed, are insufficient for destroying the Pellicle, you must then extirpate it. In order to which, the Patient must kneel down on his left Knee, if the right Knee be affected, and lean his Head back against the Light upon the Surgeon's Lap, or Knees, who then takes the small Hook, *Tab. XVIII. Fig. 3.* or *Tab. XV. Fig. 30.* and, after the Eye-lids are held open by an Assistant, endeavours to pass its Point under the thickest or loosest Part of the Pellicle, to elevate it a little. In the next Place, he takes the Needle *a*, armed with a Thread, *Fig. 1. bb.* and passing it under the Pellicle, ties it with a double Knot: And then fastening the two Ends in a Loop, *Fig. 2 b c.* he thereby attempts to make a gentle Elevation. This done, he now endeavours to separate the upper and lower Margin of the Membrane

^a CELSUS, *Lib. VII. Cap. 7. No IV.* and CASTEL, *Lex Med. per BRUNO. sub tit. ONYX.* with.

with a Lancet, that he may afterwards cut off the rest immediately in a straight Line near the lacrymal Caruncle by a Pair of small and straight Scissors. He then draws back the Thread and Membrane towards the *Cornea*, and if it adheres any where to the Eye, frees it by Degrees with a Scalpel or Scissors: In doing which, the Operator must have a principal Regard to two Things: 1. To avoid injuring the *Cornea*; and, 2. To observe that no Part of the Membrane be left adhering to the Eye; which last might occasion a Return of the Disorder. Yet it is better to leave some Part of the *Unguis* adhering to the *Cornea*, when its Separation is extremely difficult, than to wound the *Cornea*, and leave irremediable Scars in it: And this the rather, because any small Portion of the Membrane left behind may be taken off afterwards, by treating the Eye two or three Times in a Day with the gentle Escharotics before proposed at N° II. Though there are some, who rather approve of the following *Collyrium* for removing the membranous Reliques:

R. *Aq. Rosar. Damascenar. Plantag. ana. ʒj. Matr. Perlar. pp^t ʒj. Sacchari Saturni Gr. vj. Vitrioli albi Gr. iij. M. f. Collyr.*

M. ST. YVES approves of washing the Eye for three or four Days afterwards with *Sp. Vini* diluted with Water, and then to use a Solution of the *Lapis medicamentosus* in Spring Water. Lastly, in extirpating the Pellicle, great Care must be taken not to cut off any Part of the lacrymal Caruncle, and much more not to remove the whole of it: For, if this Body be wanting in the greater *Canthus* of the Eye, where it stops and directs the Tears into the *Puncta lacrymalia*, the Patient will consequently be troubled with a watery Eye, in which the lacrymal Humour will run down over his Cheek.

IV. Some of these Pellicles which appear red, from the small Blood-vessels extended to them from the Corners of the Eyes, will wither or easily fall off with the Use of Medicines, upon scarifying and dividing those Vessels in the *Canthus* of the Eye which feed and nourish them. Sometimes the *Cornea* is incrusted over with a glutinous Matter, like Fat or a Membrane, which may be readily scowred off with the Gall of an Eel, Lamprey, or the Bile of some other Animal. This was probably the Case of TOBIAS, mentioned in the *Old Testament*. Sometimes indeed we meet with Membranes of this Nature, which are inseparable from the *Cornea* by any means whatever. But this we cannot be assured of before Trial: And we ought rather to try the Operation in vain, than to relinquish the Disorder, unjustly, as incurable. Lastly, some Pellicles upon the Eye are extremely painful and stubborn, inclining to a cancerous Disposition: And these it may be best for the Surgeon to relinquish as incurable.

Other Methods of Cure.

V. When the *Pterygium* or *Unguis* is extended over the whole Eye, it will be convenient to divide it by a cruciform Incision into four Parts, according to M. ST. YVES, and then to separate each of them from the *Cornea* and Eye; (as we before directed for the *Unguis* in general) conducting the Remainder of your Dressing as we there prescribed.

Pterygium of the whole Eye.

VI. Lastly, when this Operation is to be performed upon the left Eye, the Patient should rise up from the Ground as soon as the Needle has been passed through the Membrane, and the Threads tied: For, being placed in a Chair, the Opera-

tor may have a better Command of the Eye than before; except he should happen to be as active with his Left Hand as with his Right. If the Membrane appears to be thin and weak, Care should be taken not to extend it too forcibly by the Thread, lest it should break.

C H A P. LVIII.

Of the Albugo, Leucoma, Nebula, Nubecula, and other SPOTS in the Cornea of the EYE.

Description. I. **A**S in several other Classes of Disorders belonging to the Eye, so in this we meet with a great deal of Confusion, by a Misapplication and Reduplication of several Names, which are often used to import the same Disease; whence arise Difficulties and Mistakes to the Learner, and Errors in the Method of Cure. However, we find that the most eminent Surgeons and Physicians intend, by these Names, or Sorts of whitish Spots in the *Cornea*; though they appear not always alike, and of the same Kind, being sometimes larger, or smaller, thicker or thinner, or more or less protuberant. According to their different State and Condition they more or less obscure the Sight, and sometimes wholly intercept it. Hence we have also a Reason why the Blemish was sometimes called *Leucoma* by the *Greeks*, and *Albugo* by the *Latins*, or *Nebula* and *Nubecula*; according as it appeared darker or clearer.

Causes. II. The Causes of these Blemishes are various. For they may arise, 1. from an Obstruction of the pellucid Vessels in the *Tunica cornea*, and an Inspissation of their contained Juices, proceeding from a violent Inflammation of the Eye: Or, 2. from a Suppuration, and then an Induration, of these Juices, in the *Cornea*, after an Inflammation, so that it, by Degrees, becomes more opaque, as it hardens, and puts on a whitish Hue, being sometimes mistaken for an *Unguis*^a. 3. These Spots may arise from an external Erosion or Ulcer in the *Cornea*; or, 4. from Pustules, or *Vesiculæ* in various inflammatory Disorders; particularly, 5, from those which are occasioned by the Small-Pox. 6. They may very often proceed from the Scars left after a Puncture in the *Cornea*, from a Sword, Knife, Fork, a Splinter, Glass, a Thorn, or the like, Or, 7. from a Burn; or, 8. the corroding Acrimony of caustic Substances falling into the Eye. Lastly, 9. they may sometimes be formed of a peculiar Tunic growing to the Eye itself.

Prognosis. III. These Disorders of the *Cornea* are some more and some less difficult to remove, according to their Duration, and the particular Causes from whence they proceed, with the Patient's Age, and other Circumstances. Infants may be more easily freed from them than Adults, when they are not of any long standing. But for those which are Scars formed from Wounds, Burns, Punctures, or the like, there is little or no Hope of removing them.

Methods of Cure. IV. If any one is desirous to be successful in removing these Spots, he must adapt his Method of Cure to the Cause of the Disorder. For those which arise

^a See Chap. LVII. and LX. Likewise MAUCHART's Treatise.

from inspissated Humours betwixt the *Lamina* of the *Cornea*, and are not of long standing, may be best removed by a proper Regimen, attenuating Diet, and Medicines, especially a plentiful Use of those Decoctions and Infusions which are sudorific. But then at the same time must be used externally Phlebotomy, Scarification, Blisters, and frequent washing of the Feet. Upon the Eye itself may be also applied discutient Bags *ex fol. Hyssop. Rbrismarin. flor. Chamom. Sem. fenic. &c.* boiled in Wine or Water, and frequently laid on the Eye; or a Collyrium *ex Aq. fenic. cum Sp. Vin. Campb.* Lastly, it may be convenient for the Patient to hold his Eye sometimes over the warm Vapours of Coffee, or a Decoction of the Woods. On the contrary, it will be here pernicious to use cold and astringing Collyria; especially those of white Vitriol, though they are much esteemed: Whereas warm Applications are found by Experience to be of the greatest Service. When the Inflammation is dispersed, the Patient may wet his Eye every Day with some of the *Aqua Ophthalmica Quecitan*, *cum Tutii pp.* made warm before using it. If any of the small Veins proceeding to the Spot appear turgid on the White of the Eye, it will be proper to divide them by the double-edged and crooked Needle (*Tab. I. Fig. 5. or Tab. XVI. Fig. 2.*) a Lancet or Scissors. Lastly, in some of them, which are of long standing, you may rather expect any thing than their Cure.

VI. In those whitish Spots which proceed from Abscesses, or a Suppuration of Matter after an Inflammation betwixt the *Lamina* of the *Cornea*, which they elevate like a Pea, or Pearl, (whence they are sometimes called *Pearls*) you should make an Incision into the *Cornea*, to discharge the included Matter; which might otherwise by Degrees erode the *Cornea*, and destroy the Sight. Your Incision for this Purpose may be made either by the Lancet, or by a couching Needle, *Tab. XVII.* through the *Cornea* quite to the Abscess; and repeated, if there be Occasion: Treating the Eye afterwards with some of the discutient Medicines proposed at N^o V. Others use Viper's Fat, to cleanse or heal the Puncture or Incision, and by this Means, the Sight is sometimes happily restored. But when the Matter is lodged deep, and not near the Outside of the *Cornea*, it will be impossible to preserve the Eye-sight distinct and perfect, either, by this, or any other Means.

Cure of
Spots and
Abscesses.

VII. But when the *Cornea* is eroded externally, either from an Abscess, Inflammation, or any other Cause, the following Method is taken by M. ST. YVES. First, he removes the Inflammation, and then orders the Patient to wash his Eye frequently with the *Aqua viridis ophthalmica Hartmanni*, which is made weaker or stronger, according as the Patient can bear it: The admirable Virtues of which Water for removing Spots in the *Cornea*, are strongly recommended by the same Author.

Cure of an
Albugo
from an ex-
ternal Ero-
sion of the
Cornea.

VIII. In some of those ardent or inflammatory Pustules of the *Cornea*, which appear afterwards whitish and protuberant, like a Pearl or Grain of Millet, the best and most expeditious Method of removing them is, by perforating with a Needle, so as to discharge their contained Matter. And in those Pustules arising from the Small-Pox, you ought to make an Apertion by a Needle or Lancet, immediately to discharge the eroding Matter, removing the Pellicle afterwards with some *Alumen ustum cum Saccar. cand. & Ovor. test. pp.* applied every Day to the *Cornea*. Others use Tinder, or burnt Lint dipt in Oil. By either of which.

Cure of
those from
Burns, or the
Small-Pox.

which the remaining Film will, by Degrees, vanish, according to ST. YVES, (pag. 229.) The same Method of Cure must be taken for discharging the Matter in Pustules formed in the *Cornea* from Burns; treating the Blemish afterwards with the Medicines we have directed in *Chap. LVII.* preceding.

Incurable
Spots.

IX. Those Spots of the *Cornea*, which arise from Wounds, Scars, or the Abuse of the vitriolic *Collyria*, are seldom curable: As are those also which render the *Cornea* quite opaque, and are of very long standing, or in which the natural Form of the Eye or *Cornea* are destroyed. In these Cases it is therefore much better to leave the Patient to himself unmolested, than to torture his Eyes to no Purpose, by a tedious Course of Remedies and Operations.

C H A P. LIX.

Of the STAPHYLOMA.

A Staphylo-
ma descri-
bed.

I. **U**NDER the Term *Staphyloma*, (the *Grape*) are chiefly comprised two Disorders of the Eyes: One, in which the *Cornea* is more than usually protuberant, as in *Tab. XVIII. Fig. 4, 5, 6, 7, and 8*: The other in which the Pupil or *Uvea* breaks forth and forms an unsightly Tumor on the *Cornea*, either from internal Causes, or from some wounding Instrument forced through the Coat; in which last Case the Sight of the Eye is usually destroyed. See *Fig. 8. a a.*

Kinds:

II. There are various Species and Denominations of the *Staphyloma*, according to their Size and Shape: As the *Margarita*, *Myocephalus*, *Clavus*, *Mylon*, *sive Pomum*, and the *Staphyloma* or *Acinus* strictly so called; of all which the biggest is the *Mylon*. But I have sometimes observed not only the *Cornea*, but also the *Sclerotica* preternaturally distended, and enlarged to a great Degree after the same Manner as a *Hernia ventralis*, or, the lacrymal Sack, and then the Disorder may be also denominated *Staphyloma*, because those two Coats, the *Cornea* and *Sclerotica*, are properly constituted but of one. However, it may be just to distinguish those Tumors from each other, according to the different Parts affected, by denominating one of them *Staphyloma Sclerotica*, and the other *Staphyloma Cornea*.

Prognosis.

III. A *Staphyloma* is a dangerous Disorder, as well because it greatly deforms the Eye, and destroys its Sight, as because it often induces most violent Inflammations, Head-achs, Restlessness, Abscess, and sometimes a Cancer in these Parts. The Cure of it is therefore generally undertaken, not so much to recover the Sight, as to preserve or restore the Uniformity of the Eye, and prevent the malignant Symptoms before enumerated.

Cure of a
recent Sta-
phyloma.

IV. In the Cure of this Disorder we must relieve the Tumor and Deformity of the *Sclerotica* and *Cornea*, by the Application of a Compress dipt in *Aqua aluminis*, together with a Plate of Lead and Bandage, or some proper compressing Instrument. If the *Uvea* protrudes itself through a Wound in the *Cornea*, it should be returned by a Probe. The Patient in the mean time must lie in a
supine

supine Posture, and the Wound be constantly dressed with the White of an Egg, or Mucilage of Quince-seeds, till it is healed: By which Means the Patient often recovers his Sight.

V. If the Disorder is become inveterate, and inflexible to all Remedies, you must pass a Needle with a double Thread through the Middle of the Tumor, as in *Fig. 8. Tab. XVIII.* Then the two Ends of the Thread are to be tied together in a Knot, first on one Side, and then on the other: By which Means the Tumor will gradually wither, and, at length, fall off together with the Threads.

Cure of an
inveterate
Staphyloma.

VI. But as this Ligature frequently occasions violent Pain, Inflammation, and sometimes a Suppuration of the Eye; it would seem to be a more safe and expeditious Method to extirpate the Tumor by the Scissors or Scalpel. In this Manner I myself once cut off a Protuberance of this Kind at the Root, from the Eye, of the length of one's Finger, by a Pair of Scissors.

Another
Method.

VII. M. ST. YVES's Method of removing these Protuberances, (see his Treatise, p. 222.) when they have not wholly covered and obscured the *Cornea*, is to pass a crooked Needle and Thread of Silk through the Middle of the *Staphyloma*: After removing the Needle, he twists together the Thread, and extends them with his Left Hand; while, with a Scalpel or Lancet, he frees the Tumor under the Ligature, till he can, at length, totally extirpate it by the Scissors. Lastly, he applies a Compress over the disordered Eye, dipt in *Sp. Vini*, diluted with Water, as was observed in treating of the Cataract. And thus not only the *Staphyloma* is removed, but the *Cornea* itself becomes perfectly healed, or else leaves but a very small Aperture in the Middle of the Wound: From whence indeed the aqueous Humour is continually discharged as fast as it is secreted in the Eye, but without any Trouble or Uneasiness to the Patient; because it flows gently with the Tears through the lacrymal Passages into the Nose.

The Method
of M. ST.
YVES.

VIII. When the whole *Cornea* is infested with a *Staphyloma*, as in *Fig. 4, 5, 6, 7.* the most expeditious Method of Cure is that of ST. YVES, by cutting out circularly not only the *Cornea*, but also the *Iris* or *Uvea*, all round within a Line of the Ring, by which it touches the *Albuginea*: After which, all the Humours of the Eye falling out, the remaining Coats contract themselves into a smaller Compass, and the Wound itself will gradually heal up. You must then provide the Patient with an artificial Eye, adapted in Size, Shape, and Aspect, to supply the Place of that which is wanting. In this Manner the artificial Eye may frequently be moved from one Side to the other by the remaining Muscles of that Organ, so that many cannot discern it to be an artificial, but will take it for a true or natural Eye: And in this last Method I myself have cured the *Staphyloma*.

A second
Method of
ST. YVES.

C H A P. LX.

Of the HYPOPYON.

Description. I. **W**E frequently meet with a Collection of purulent Matter immediately under the *Cornea*, in the Place of the aqueous Humour: which Disorder is generally denominated *Hypopyon* or *Pyosis*^a. The *Hypopyon* arises from an Extravasation of Blood or Matter in this Part, which may happen by a violent Inflammation, the Small-Pox, couching a Cataract, or from other external Injuries of the Eyes from Violence, as Contusion, from a Blow or Fall, a Burn, &c. It is at the Beginning very often attended with excruciating Pains both of the Head and Eyes: And, according to the Degree of Injury, is soon after followed either with Blindness and a Destruction of the Eye, or Death itself.

Cure. II. There are chiefly three Methods of treating this Disorder. The first and mildest is by dispersing the Matter with discutient Remedies; such as the Application of Compresses dipt in a Decoction of Sage, Eye-bright, Hyssop, and Fennel-seeds in Wine or of little Bags stuffed with the same Ingredients, and boiled in Wine, which are to be frequently renewed: By which Means, when the Blood or Matter is in no great Quantity, the Eye recovers its former Integrity and Action, as I have frequently experienced. Therefore you should continue the Patient in this Method so long as you find any Benefit from it, even till the corrupt Matter or Blood is all dissipated or dispersed. But, if the Pain and other Symptoms are rendered more intense by these Applications, you must proceed immediately to the Operation. Otherwise, there will be great Danger of the contained Matter's eroding the *Cornea*, and destroying the internal Parts of the Eye, which will induce Blindness after the most intense Pains.

Cure by agitating the Head.

III. But before we treat of the Operation, it may be proper to describe the Method of Cure, which, we read, was formerly used with Success by JUSTUS, an eminent Oculist in the Time of GALEN, who himself was an Eye-witness of his Practice, as he writes in the End of his XIVth Book *De Methodo medendi*. In the first Place, he seated the Patient on a Sort of Chair over-against himself; then taking Hold of his Head with both Hands, he shook it about very assiduously, till all the purulent Matter disappeared: In which Operation it is very remarkable, that GALEN himself testifies, the Spectators could perceive the corrupt Matter gradually subsiding to the Bottom of the Eye. Most People will be apt to reject this Method, as useless and ridiculous: But my Opinion is, that it may be often very effectual in removing the *Hypopyon*. In this I am confirmed, not only by the Authority of GALEN, but also from my own Experience

^a Indeed M. ST. YVES names this Disorder of the Eyes *Onyx*; the *Hypopyon*, according to him, being a Suppuration in the *Tunica Cornea* itself: So that an *Onyx*, or *Unguis*, may arise from an *Hypopyon*, when the Matter of the last erodes into the *Cornea*, by destroying its internal *Camellia*. See his Treatise, *De Morb. Oculor.* Part II. Cap. 9. pag. 221, & seq. Hence we may see how much even some of our modern Surgeons and Oculists are at Variance in their ascertaining the Disorders of the Eyes and their Names.

in a Patient who, being just entered under my Care for an Hypopyon, was obliged to take a Journey in a Chariot; by the repeated shaking and jolting of which, upon his Return the next Day, I found all the purulent Matter dispersed: And, without doubt, it was subsided or thrown down behind the Uvea. It may therefore not be improper to try this Practice before the chirurgical Operation by the Hand and Instruments. But before you shake the Head, it will be proper to dispose it, or the Patient's whole Body, in a supine Posture, and to press the Eye, first, with the Fingers, in order to loosen and remove the Matter. But, when the Disorder is great and obstinate, the purulent Matter being too copious, or too firmly fixed to be dispersed in this Manner, Recourse must then be had to the Operation long ago described and recommended by GALEN, ÆTIUS, and others of the Antients: Which has met with so much Neglect among our modern Surgeons and Oculists, that it would scarce have been known or heard of at present, if it had not been restored in the last Century by RIVERIUS, MEEKREN, NUCKE, and BIDLOW.

IV. Preparatory to the Operation, your Patient must be placed and seated against the Light, with his Head and Hands firmly secured each by an Assistant, as in couching a Cataract. Then the Surgeon himself depresses the lower Eyelid, while an Assistant elevates the upper. The Operator now takes a Lancet, and therewith cautiously incides through the *Cornea*, below the Pupil, and about the Space of a Line from the *Albuginea*, making his Apertion big enough to discharge the Matter with the aqueous Humour; but with Caution at the same time to avoid wounding the *Uvea* behind the Matter. If the Matter does not discharge freely of itself, you must assist it by a gentle Pressure and Agitation with your Fingers: And in about three or four Hours after the Operation, you must dress the Eye with a Compress dipt in a Collyrium *ex Aq. Plantaginis vel Rosar. & Albo Ovor.* or a Mucilage *ex Sem. Cydonior.* prepared, either of them, with or without Camphor. By this Means you will find the Wound in the *Cornea* quickly healed, and the aqueous Humour soon after restored, with the Patient's Sight, if none of the internal Parts are injured. And though there may remain a small *Cicatrix* in the *Cornea*, yet that being made lower than the Pupil, will cause very little, if any, Impediment to the Sight. In the mean time, to perform this Operation with the Lancet safely, you ought to involve that Instrument in Lint, or a Piece of Plaster, so as to leave not above a Straw's Breadth of its Point uncovered, that it may not run too far into the Eye. MEEKREN has on this Account invented an Instrument purposely for the Operation, published in the Tenth Chapter of his Chirurgical Operations, and delineated in our *Tab. XVIII. Fig. 10.*

Method of
operating.

V. Sometimes the purulent Matter is found too much inspissated to be easily discharged through the Incision made by the Lancet in the *Cornea*: And in that Case it will be more convenient to use the Needle, *Tab. XVIII. Fig. 12.* which we have elsewhere proposed for making Setons. For the recurve Point of this Needle is not only less apt to wound the *Uvea*, but by its triangular Figure it also makes a larger Aperture, which will more readily discharge the inspissated Matter: But then we usually involve this Needle almost up to its Point in a Slip of some Plaster, as I before advised you to do the Lancet. PLATNERUS has given

Another
Method of
Cure.

us the Figure of a particular Instrument for this Purpose^a, having a Sort of triangular *Apex*, the Invention of which he ascribes to Mr. WOOLHOUSE. See our *Tab. XVIII. Fig. 13.* When the Matter included under the *Cornea* is too thick to flow out of itself, or by Pressure, M. ST. YVES^b proposes to wash it out by injecting with a small Syringe, repeating the Operation every Day, till it be all removed: And then you may proceed to heal the Wound in the *Cornea*. If any Inflammation appears, the Patient should be bled, blistered, scarified, and the affected Parts treated with a discutient Fomentation, and other proper Medicines.

C H A P. LXI.

Of Inciding the CORNEA, to discharge Extravasated BLOOD.

When the
Operation is
necessary.

I. **B**LOOD extravasated in but a small Quantity from external Violence, or Injuries offered to the Eye, may be generally dispersed and carried off by the discutient Remedies before proposed at N^o II. of the preceding Chapter. But when the Quantity is larger than can be thus removed, you ought immediately to open the *Cornea* by Incision, as we directed in the preceding Chapter, to prevent the stagnant Blood from suppurating and destroying the Eye.

An Instance
of this Pra-
ctice.

II. But lest any body should think I propose of my own Head a rash and unheard-of Practice, I shall give the Reader an Instance of it (from the *Hist. Acad. Paris. An. 1709. pag. 16. Edit. Amstel.*) in which it succeeded very well. Therefore, whenever any Person has, by some external Violence, had so much Blood extravasated in his Eye, as to destroy his Sight, and be incapable of Dispersion, it is the Advice of the Physician GANDOLPHUS, to have Recourse to this Practice. He therefore instantly made a transverse Incision through the *Cornea*, and, by that means, happily discharged the extravasated Blood, in such a Manner, that the Patient was cured with hardly any Pain, and without any deforming *Cicatrix*, so that he recovered his former Sight without any Defect: And yet he was obliged to perforate the *Cornea* three Times, by reason of the Quantity and strong Adhesion of the Blood. To promote the healing of the Incision, he, for the Space of eight Days, applied Compresses dipt in a Mixture of *Aq. Plantag. ℥iv. & Aq. Vulneraria ℥ij.* In little more than a Week's Time, the Cure was so well performed, that one could perceive no Difference betwixt the Eye that had undergone the Operation, and the other which had not; excepting only that it's Pupil was a little larger than the other, which seems to have been rather the Effect of the Blow than of the Operation.

^a *Dissert. de Fistulâ lacrymali.* ^b *De Morb. Ocul. p. 227.*

C H A P. LXII.

Of the DISTENTION and PROLAPSUS OCULI, also the FUNGUS and CANCER.

I. SOMETIMES the Eye is so violently inflamed and swelled, that it cannot be contained in its Orbit or Socket by the Lids, but protrudes itself out of its natural Seat. This is a Disorder attended not only with great Deformity, but also with intense Pains, and frequently Blindness or an obstinate Cancer. How ghastly the Disorder appears, may be perceived, I think, from the Figures we have given of it in *Tab. XVIII. Fig. 14, 15^a*. PAREY mentions a Case he saw, in which the Eye was so vehemently distended by pernicious Humours, that it at last burst out of its proper Coats; and the like may be also seen in MUYS, *Dec. II. Obs. I.* This is termed by the Greeks a *Proptosis*, and by the Latins a *Prolapsus Oculi*: But by some it is denominated an *Hydrophthalmia*, and by others *Escophthalmia^b*, when the Eye is very much distended with a watery Humour; but the more modern Authors have, from its Similitude, named the Disorder, *Oculus Bovinus aut Elephantinus*. Though I must confess that many of these Names are rather intended to signify different Diseases than one and the same; whence Error and Confusion. The Causes of this Disorder are various, being sometimes from a violent Inflammation, or a Redundancy of Humours in the Eye, from an Obstruction of the reductory Vessels; sometimes from a *Scirrhus*, Cancer, or some external Violence. The Instances given us by HILDANUS, *Cent. I. Obs. I.* MUYS, *Dec. XII. Obs. 1.* and by me, in *Tab. XVIII. Fig. 15.* seem to have been from a Cancer: And more Instances of the same Kind may be seen in STALPART, VANDER WIEL, *Part II. Obs. 9.* and in the other Writers of Observations. Lastly, there are some Surgeons and Physicians who denominate this Disorder *Ficus* or *Fungus*, which are in reality different Diseases.

II. When the Disorder is recent, and the Figure of the Eye is not yet deformed, those Humours, producing the *Hydrophthalmia*, may be generally dispersed by Bleeding, Purging, and Vescatories, with internal Attenuants and Di-luents, and external discutient Fomentations. But, if the Case is too obstinate to yield to Remedies, you must have Recourse to the surgical Operation of *Paracentesis*, as in other dropical Cases. This *Paracentesis* must be made either with a Lancet, or a small *Trocar*, to discharge the offending Humours, repeating the Discharge every Day, or every other Day, or as often as shall be found necessary. At every Dressing, a concave Plate of Lead, with a Compress dipped in some discutient Liquor, (see *Chap. LX. N. II.*) should be firmly secured upon the Eye, to recover its natural Figure. By carefully

Nature of
the Disorder.

Cure by Dis-
cutients or
Puncture.

^a Vid. BARTISCHIUS in *Chirurg. Oculari* p. 218. and HILDAN. *Obs. 1.*

^b Vid. NUCKE *De Ducl. Aquos.* p. 119. & 120. STALPART. VANDER WIEL, &c.

observing this Method, NUCKE^a cured a Patient of an *Hydrophthalmia*, though he made his *Paracentesis* in the *Cornea* itself: But as that may leave an ugly *Cicatrix* in the *Cornea*, I rather make my Perforation with a Lancet in the *Sclerotica* than in the *Cornea*. After discharging the Humours, I dress the Eye with Lint dipt in *Aq. Rosar. & Album. Ovor. permist.* defend it with the Leaden Plate, and then apply my Compress dipt in *Sp. Vini*; and lastly, my Bandage, not neglecting Internals at the same time, till the Eye is cured, and recovers its State.

Cure by the
Scalpel.

III. When the natural Figure of the Eye and its Office of Vision are destroyed, and the Pains become more and more intense, there then remains but one, and a lamentable Method, of relieving the Patient, by making a transverse Incision through the Coats of the Eye, and discharging the contained Humours: Which done, and the Eye deterged as in other Ulcers, you must cover the Eye-lids with Compress and Bandage. But if, after the Humours are discharged, the Eye remains larger than can be easily covered with the Eye-lids, it will be necessary to cut off so much as is redundant with the Scalpel or Scissors: By which Means the Deformity may be afterwards the better concealed by an artificial Eye. Sometimes the Surgeon may cut out the *Cornea* by a circular Incision, in this Disorder, as we proposed in the *Staphyloma*, Chap. LVIII. preceding.

Another
Method
of Cure.

IV. BARTISCHIUS, HILDANUS, and MUYS, have contrived a crooked Scalpel, like a Spoon for extirpating the Eye when it is thus disordered: But, upon mature Consideration, I believe the Surgeon will not stand in need of any such Instrument. For, to say nothing of the Difficulty you will meet with in sharpening and using such an Instrument, it will be found, in most Cases, sufficient to extirpate only the redundant or tumified Part of the Eye, which prevents the Eye-lids from closing: To which you may add, the Danger there will be of wounding and uncovering the thin Bones which compose the Orbit, by this crooked Scalpel. But if ever the Surgeon shall find it necessary to extirpate the whole Eye for a *Scirrhus*, or cancerous Disorder of it, he may perform the same with equal Advantage by the strait Scalpel, *Tab. XII. Fig. 14.* which is the same I used in extirpating those ghastly Tumors of this Kind, represented in *Tab. XVIII. Fig. 14, and 15.* Though there are some Surgeons who think it the mildest Practice to free the Eye so far from its Orbit by a Scalpel, till you can make a Ligature about the Protuberant Part in order to remove it, by that Means, like other Excrescences. But the more prudent in the Profession generally prefer any Method to this, because of the intense Pain, Inflammation, and Convulsions, which, by this Means, torture and often kill the Patient. Therefore whenever you meet with the Eye infested, even to its Root, with a *Schirrhus* or Cancer, there is no safer Method of relieving the Patient from his painful Disorder, than by extirpating it clean out from the Orbit, in the Manner performed by HILDANUS and MUYS; deterging and healing the Wound afterwards in the usual Method.

^a Lib. *De Ducl. Oculor. aquos.* pag. 120. and VALENTINI in *Misc. Nat. Cur.* Ann. VI. Obs. 70.

V. It sometimes happens in this Disorder, that after having performed the Operation, a new fleshy Excrescence sprouts up over the Eye, and forms a fresh Tumor: To prevent which, you must dress with Lint dipt in *Aq. Phagedænica*, and make a pretty tight Deligation over the Leaden Plate with which you are to cover the Eye. It may be here also observed, that Cancers of the Eye, like the same Disorder in other Parts, will very often return, after they have been seemingly cured by the Operation and Treatment here proposed, and may be again removed by the same Practice; as appears from the Observation of *MUYS*, before cited. Lastly, when the Disorder arises from a *Caries*, or *Spina ventosa* of the Bones themselves composing the Orbit, if it will not give way to Mercury (as it often does) the Physician must then be content to palliate the Disorder, relieve the Pains, and prevent its bad Consequences: For a total Removal thereof is frequently altogether impracticable.

C H A P. LXIII.

Of ARTIFICIAL EYES.

I. **T**HE Loss of an Eye is frequently occasioned by a Wound, an Abscess in the Small-Pox, or an Operation in Surgery: And then the unhappy Patient is desirous of concealing his Misfortune by an artificial Eye, which is contrived to hide the Deformity arising from this Accident. The modern artificial Eyes are made of concave Plates of Silver, Gold, or Glass stained or enameled, so as to resemble the natural Eye. See *Tab. VII. Fig. 1.* The nearer it approaches the sound Eye in Size and Appearance, the more firmly it will stay under the Eye-lids, and the more easily deceive the Spectator. But it will be frequently necessary for the Patient to wipe his artificial Eye clean, lest if any Gum or Sordes should gather upon it, the Fallacy might be thereby discovered: To prevent which, it may be also proper for him to be provided with several of these artificial Eyes, that if one should happen to be lost, broke, or disfigured, its Place may be immediately supplied with another. Upon going to Bed, it is proper to dismount the artificial Eye, and to replace it again under the Eye-lids, after he wakes in the Morning. But then, that the artificial Eye may be taken out and put in with Neatness and Conveniency, the Surgeon must take care to remove so much of the disordered Eye, as will make Room for receiving the artificial.

II It is here to be observed, that the more closely the artificial Eye is compressed by the Eye-lids, and by the diseased Eye, the more perfectly it will perform the Motions of the natural Eye, which it will receive from the remaining Muscles which agitate the diseased Globe. It is therefore not without Reason that we before advised the Surgeon to remove no more of the Eye than what was preternaturally projected beyond its anterior Part: Except when a *scirrhus* or

Their Composition.

Motion of the artificial Eye.

or Cancer should require an Extirpation of the whole; and then indeed it cannot be expected that the artificial Eye should have any other Motion than what it receives from the Lids.

It is sometimes better to be without them.

III. I have several Times observed some of these artificial Eyes produce Pain, Inflammation, Tears, and other Inconveniencies, by irritating the Parts which are not of a proper Conformation, or when the artificial is not right shaped; so that they will often inflame, weaken, and destroy the Sight of the sound Eye. In such Cases, it will be best for the Patient either to provide himself with an artificial Eye which is better adapted, or else totally to relinquish the Use of them, rather than lose the Use of both Eyes.

C H A P. LXIV.

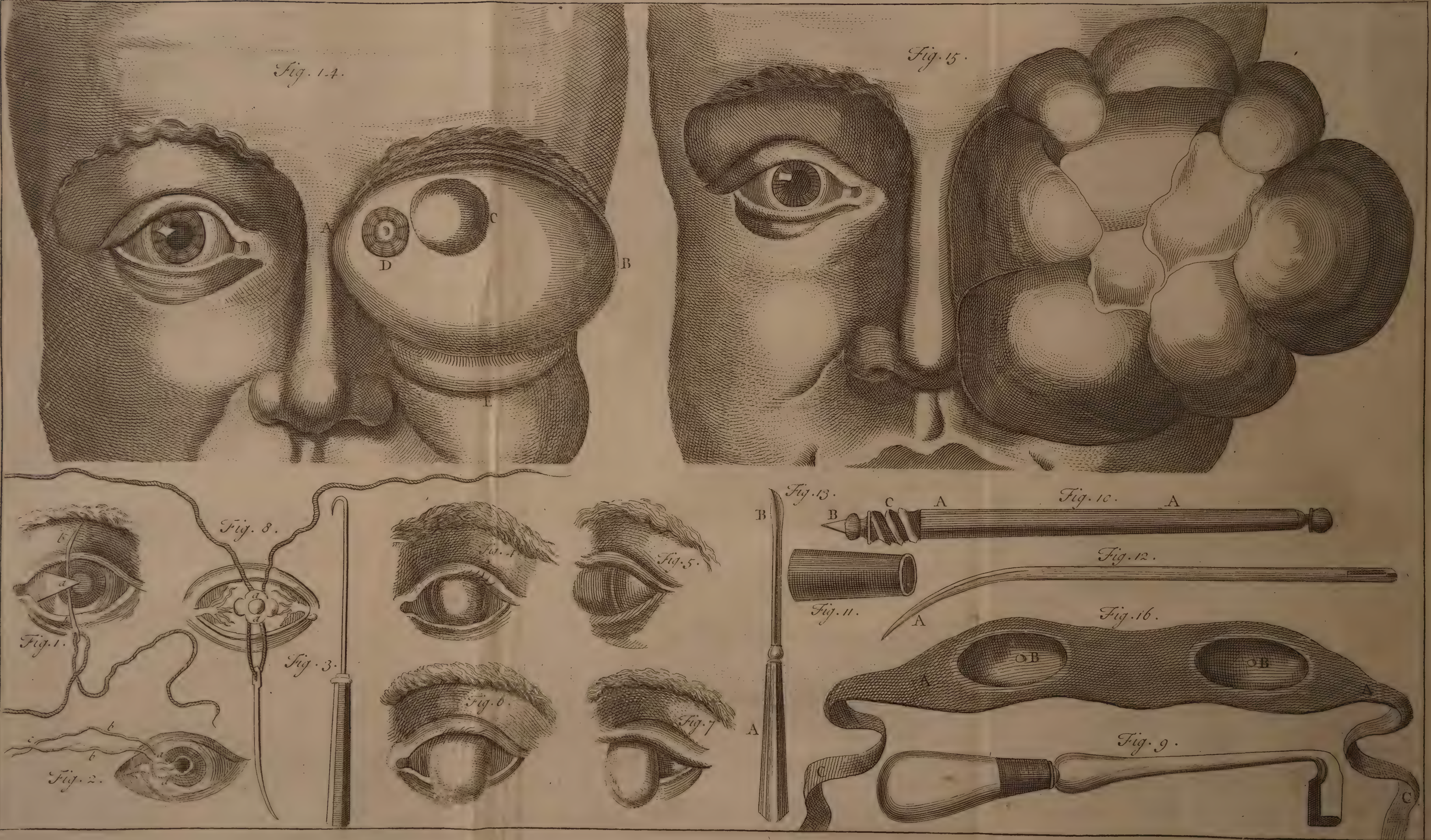
Of the STRABISMUS, or SQUINTING.

Causes.

I. **W**E frequently meet with Persons whose Eyes, when they look upon any thing, are distorted, or turned towards the outer or inner Corners of their Eye-lids, instead of being directed towards the Object: Which is the Disorder commonly termed *Strabismus*, or *Squinting*. Sometimes only one Eye, but more frequently both are thus affected. The Disorder is frequently caused in Infants, from letting them constantly suck at one and the same Breast, or placing them in the Cradle, so that they always look the same Way towards the Light or Window. By this repeated Action, the Muscles on that Side become too strong and powerful to be balanced by the rest which counter-act them on the other Side of the Eye; whence it is contorted, or looks obliquely. But this Disorder is more frequently caused in Infants from convulsive and epileptic Motions; to which the Muscles of their Eyes, as well as of their other Limbs, are extremely subject. Lastly, it may proceed as well in Adults as Infants, from a Spasm and Rigor, or from a Palsy in one or two of the Muscles of the Eye, as also from a Defect or Insensibility in some Part of the *Retina*. For when that Part of the *Retina* which is opposite to the Pupil, and receives the Impression of the Object, is from any Cause rendered insensible, the Patient is then obliged to turn his Eye obliquely, till the Pupil directs the Rays from the Object upon some other sound Part of the *Retina*, in order to see the same.

When and how it may be cured.

II. Squinting is a Disorder which is hardly ever cured without Difficulty, more especially when in Adults, and caused by some Defect in the Muscles or *Retina* of the Eye (especially if the Disorder arises from a bad Habit only.) But in young Infants you will probably succeed, according to the Advice of M. ST. YVES,, by frequently placing them before a Looking-glass, that their Eyes may be directed towards the Image of their own Face. Those more advanced in Years may be assisted by reading very small Writing, or inspecting very minute Objects, provided you direct them to turn their Eyes even, and to bathe them at Times with *Aq. Hungar.* or anoint them with the *Balsamum Floravanti*. There are others who propose to cure this Disorder with a Sort of Mask



Mask or Eye-swatch, as in *Tab. XVIII. Fig. 16.* taken from SOLINGEN, and described more particularly in the Explanation of the following Table. This Method is also recommended by BARTISCHIUS in his *Ophthalmoduleia*, pag. 15, 16 and 17. But, lest Infants should look strait through the Aperture with only one Eye, and squint in the mean time with the other, it will be best to bind up one Eye till the other is rectified, and then to correct the other in the same Manner; which is seldom practicable, through the Unruliness of Infants, and other Impediments.

An EXPLANATION of the EIGHTEENTH PLATE.

- Fig. 1.* Denotes an *Unguis a* on the Eye, with the Method of passing a Needle and Thread under it *bb*, for its Removal.
- Fig. 2.* Represents another *Unguis*, or *Pterygium a a*, with a Thread tied round it *bb*, and at their Extremities tied in the Knot *c*, to form a Loop for extending and elevating the same: But that the Thread may not slide upon the Film, it is first tied with the double Knot *a*.
- Fig. 3.* Represents a Hook used in separating Films, and other Tubercles, from the Eye.
- Fig. 4.* Denotes a front View of a *Staphyloma*, or Protuberance of the *Cornea*, which I cured.
- Fig. 5.* Gives a lateral View of the same *Staphyloma*.
- Fig. 6.* Represents a front View of another larger and more depending *Staphyloma*, which I cured.
- Fig. 7.* Gives a lateral View of the same.
- Fig. 8.* Is a lesser *Staphyloma*, marked *a a*, with a double Thread passed under it, from SOLINGEN.
- Fig. 9.* A *Scalprum*, to scrape or exfoliate carious Bones in the *Fistula lacrymalis*, from PLATNERUS's Dissertation *De Fist. lacr.*
- Fig. 10.* Represents MEEKREN's Instrument for perforating the *Cornea* in an *Hypopyon* *AA* the Handle; *B* the Scalpel, or rather the Point of a double-edged Scalpel, having a Button or Protuberance at its Basis, to prevent the Point from entering too deep into the Eye: *C* the Screw by which the *Cap-sula* or Case, *Fig. 11.* is fastened on.
- Fig. 12.* Denotes a large Needle which may serve to make Setons; but is here designed to perforate the *Cornea* if you secure it from entering too deep, by involving it in a Slip of Plaster up to *A*.
- Fig. 13.* Represents an Instrument designed to perforate the *Cornea* in an *Hypopyon*. *A* denotes the Handle, *B* the triangular Point a little crooked, almost like the preceding Needle; which should, like that, be involved in a Slip of Plaster up to the Point, to prevent its entering too far beyond the *Cornea*.
- Fig. 14.* The Letters *AB* denote a scirrhous Eye, enlarged to the Size of an Hen's Egg, upon which is a blackish Tubercle, like a Grape, marked *C*; and *D* denotes the vitiated Pupil and *Cornea*. *E* the lower Eye-lid depressed by the Tumor.

Fig. 15. Denotes a larger Fungus of the left Eye, weighing half a Pound, which, with the preceding, I extirpated and cured in 1711, the particular Nature and Treatment of which I shall describe in my *Chirurgical Observations*, which I intend shortly to publish.

Fig. 16. Represents a Bandage to cure the Disorder of Squinting in Children. L. AA. two concave Plates of Silver, Ivory, or Ebony, perforated in the Middle: L. CC the Bandage by which they are fixed to the Eyes. Children are, by this Method, practised to direct their Eyes strait forward through the Apertures, and thereby acquire a regular Habit.

The END of the FIRST VOLUME.



INSTITUTIONS

O F

SURGERY.

PART the SECOND.

SECT. II.

Of DISORDERS in the EARS.

CHAP. LXV.

The Apertion of a closed MEATUS AUDITORIUS.

TH E *Meatus Auditorius* is sometimes closed from the Birth with a Membrane differing in Degrees of Thickness, formed sometimes immediately after the Birth, and sometimes a considerable while after, when the Child should begin to talk: for Deafness and Dumbness almost constantly go together. If the Child be therefore observed not to talk so soon as usual, the Disposition of the Ears and Tongue ought to be examined; because very often one may meet with some Impediment in the Ear, which may be sometimes removed with more or less Difficulty, as it is seated more or less superficially. When the external Ear is closed by a Membrane, its Faculty of Hearing may be restored by removing the Membrane, which may be done without Difficulty when superficial: but when it lies very deep in the Ear, 'tis a more dangerous Case; because in perforating, or removing the preternatural Membrane, you are liable to wound the Membrane of the *Tympanum* at the same Time. When the occluding Membrane is not seated too deep, you may make a cruciform Incision through it, and keep the Passage open with Lint or a Tent as long as you shall see necessary: and thus you will probably cure the Patient

VOL. II. B both

both of his Deafness and Dumbness. But when the said Membrane is seated very deep in the Ear near the *Tympanum*, the Success of your Operation will be very hazardous: yet you ought notwithstanding to attempt it, since he can but be as he is, without his hearing, if you do not succeed. You may divide the preternatural Membrane either by a transverse or longitudinal Incision, taking care that you do not at the same Time wound the Membrane of the *Tympanum*, which in Infants is not seated so deep in the Ear as in Adults.

C H A P. LXVI.

Of extracting foreign Bodies from the Ears.

THE Hearing is frequently impeded by an indurated Lump of the Ear-wax, or by a Pea, Cherry-stone, Insect, or the like, having slipt into its Cavity. These are to be extracted upon two Accounts: first, because they give the Patient great Pain and Uneasiness; and, secondly, because they destroy his Hearing. You may know of what kind the offending Body is, partly from the account of the Patient, and partly from inspecting and searching with your Probe. When the Wax is so dried up and hardened, as to bring on Deafness, you should inject a little of the Oil of Sweet Almonds or warm Milk into the Ear, and order the Patient to hold his Head inclined on the contrary Side while you use the Syringe. But the Cerumen of the Ear is often too much indurated to be mollified and discharged at one Operation; and therefore you must syringe the Patient several Times till the Impediment is removed. If a small calculus, or a Cherry-stone, be lodged in it, you must first of all relax and mollify the Passages of the Ear, by dropping in some warm Milk or Oil, and then carefully extract the Body with your Probe, or the Pliers represented in *Tab. I. lit. E.* But if the foreign Body should happen to be a Pea, Bean, or some other grain, which is too much swelled by the Humours to be discharged entire by the Probe, or other Instrument, you must break it with Pliers, or cut it with small Scissars, and extract it by a bit at a time. Sometimes a Flea, or other Insect, gets into the Ear, and, by struggling to get loose from the glutinous Ear-wax, excites an intolerable *Pruritus*, and Tickling, which in time turns to acute Pain. These, when you can perceive them, may be drawn out by a Probe or Pair of Pliers; and, if these fail, you may inject warm Oil, or Spirit of Wine, which will quickly kill the Insect, and then you may wash it out with the same, or some other Liquor, and afterwards cleanse the Cavity of the Ear with a Bit of Cotton or Lint upon the End of your Probe. There are some who recommend bitter Infusions or Decoctions of Wormwood, *Colocynthis*, &c. to be injected into the Ear to destroy the Insects: but, in my Opinion, warm Oil, or Spirit of Wine, is much fitter for this Purpose than any other Liquor. For though Bitters quickly kill some Insects, yet there are others which seem to be delighted with them, but I know not of any Insect which is not quickly destroyed in Oil, or Spirit of Wine.

C H A P. LXVII.

Of Tubercles in the Meatus Auditorius.

MANY Patients are troubled with Tubercles, or fleshy Excrescences in the auditory Passage of their Ears, which give them great Uneasiness, and do partly, if not totally, obstruct their Hearing. When they are not of long standing, you may remove them with Escharotics, if you first arm or defend the auditory Passage, by filling it with Lint or Cotton, that none of the Caustic may touch the Membrane of the *Tympanum*. To avoid this it will be preferable to extirpate them by the Scissars or Scalpel, when they are not seated too low in the Ear. If these Tubercles are too much concealed in the Cavity of the Ear to be conveniently removed by the Scalpel or Scissars alone, you may extend and elevate them with a hook; or if they are very accessible, and the Caustic does not take effect, you may apply the actual Caustery with Success. Lastly, it is apparent, from the Observations of HILDANUS (*Cent. 3. Obs. 1.*) and PURMANUS (*Chirurg. pag. 280*) that these Tubercles may be frequently removed with Success by ligature. Consult the Cases related by those Authors, which are illustrated with Figures.

C H A P. LXVIII.

Of Cauterising behind the Ears for the Tooth-ach.

IT has been observed by NUCKE, SOLINGEN, DEKKERS, VALSALVA, and many other ingenious Physicians, that obstinate Pains of the Teeth, which could be relieved by no Medicines whatever, have yet been speedily removed by cauterising behind the Ear, underneath that Protuberance which is termed *Antitragus*. The Authors before-mentioned have described and figured the Caustery with its Case for this Operation, as you may see in our *Tab. XIX. Fig. 1.* but, in my Opinion, a common Nail, or bit of Iron Wire, would do as well. It is indeed remarked by the celebrated Anatomist and Physician SPIGELIUS, that SCULTETUS happily cured the Tooth-ach by cauterising the Part mentioned by plunging a red-hot Scalpel into it: and VALSALVA asserts, that he has had equal Success barely from making an Incision in this Part without heating the Scalpel at all. But what should occasion so sudden a Removal of the Tooth-ach from this Practice? Some will answer, it is by burning or dividing a Nerve which passes from this Part of the Ear to the Teeth, which must consequently make them insensible of Pain. But, for my own Part, I must confess, when the Patient is so suddenly relieved by this Practice, I think it rather proceeds from the Fright, than from the Cauterisation of any Nerve, since we cannot find any that passes from thence to the Teeth: and I know it is not an unusual thing for a very intense Tooth-ach to vanish at the Patient's Sight of the Surgeon's Instrument, with which the Tooth is to be drawn. Lastly, I must not omit observing, that notwithstanding what others affirm, I have often tried

Of Cauterising behind the Ears for the Tooth-ach. Part II.
this Practice without the desired Success : therefore it will not answer to the Character given of it by its Patrons ^a.

C H A P. LXIX.

Of Acoustic Instruments to help the Hearing.

AS a weak Sight may be rendered stronger by concentrating the luminous Rays to the Eye with Glasses, so the Hearing may be also assisted by collecting and concentrating the sonorous Rays by acoustic Instruments. There are several Sorts of these Instruments, but all of them bear a Resemblance to the Trumpet. That Sort which is found to be the best and most commodious, is that in *Tab. XIX. Fig. 2.* beginning with a small *Apex*, and ending in a broad *Basis*, the whole being a little crooked. Those are also highly recommended by NUCKE and DEKKERS, which we have represented at *Fig. 3.* and *4.* The two former of these at *Fig. 2* and *3.* are used by fixing the small End A into the Cavity of the Ear, holding the Part B in your Hand. The third and last of these Hearing-trumpets is much the smallest, and made in the Shape of a Snail's Shell, and is, by DEKKERS, recommended for its Conveniency above the former; because, by its Smallness, it may be placed under the Cap or Wig without being observed, and then you fasten it by Strings round the Ear. But Experience teaches us, that the first of these Instruments is the best, though the most simple, and least expensive. It was reported a few Years ago in the public News, that one TRUCHET, a Mathematician and Monk in *France*, Fellow of the Royal Academy, had, by his great Ingenuity, contrived at *Paris* an acoustic Instrument so small, as to be concealed under one's Wig, and yet so powerful, as to augment the Hearing beyond all Belief. But I have never yet been able to learn, by Letters sent to my Friends at *Paris*, and others, any thing at all concerning the Truth, Make, or Usefulness of this Instrument. Yet I think Mechanics ought to be encouraged to greater Diligence in these Sort of Machines, because they may redound to the general Use of Mankind. We have a kind of Silver Trumpet gilt, of a Span's Length, proposed a few Years ago by REUSNERUS for Deafness, Pains and Tinglings in the Ears, (*Ephem. Nat. Cur. Cent. V. Obs. VI.*) which he orders to be inserted twice a Day into the Ear, and thereby to suck out the foreign Air which offends that Organ; which is too whimsical to need any farther Notice. In the mean Time I must recommend the first Tube in Shape of a Horn, *Fig. 2.* as the best and most commodious Instrument we are yet furnished with, to assist those who are hard of Hearing, which may be made either of Silver or Brass.

^a SCHELHAMMER, in his Treatise on the Tooth-ach, tells us it may be cured by a strong Pressure of the Fingers on this Part of the Ear.

C H A P. LXX.

Of boring the Lobes of the Ears.

TO bore or perforate the *Lobes* of the Ears, you must first of all mark the Place with a Spot of Ink, which should be generally in the middle, and then with a common large Needle, after extending the Lobe betwixt your left Fore-finger and Thumb, you perforate it in the Mark, and insert an Ear-ring, or the small Plummit of Lead, *Tab. XIX. Fig. 7.* bending it into a Ring after it is introduced: this you dress two or three Times a Day with *Ol. ovor. aut Hyperici*, and gently shift or draw it round through the Puncture till it is healed. But for Ear-rings it is generally better to perforate a little higher than the middle of the Lobe, lest it should be lacerated, or cut through by them. To perform this Operation with little Trouble to the Surgeon, and less Pain to the Patient, we are furnished with an Instrument for compressing and securing the Lobe of the Ear before and while you perforate it, as in *Tab. XIX. Fig. 5.* The two Cheeks of the Instrument are applied, so that the *Foramen B* covers the Spot of Ink on the Lobe; then the Ring *A* is thrust upwards, so as to compress the Part, and render it less sensible. You next perforate the Lobe with a Bodkin of Silver, or Gold, or rather with a steel Needle almost like the common Sort, only furnished with a Cavity in the obtuse End, as in *Fig. 6. A B*, to introduce the leaden Plummit, *Fig. 7.* which is then left in the Ear, and shifted round, as I before directed, till the Puncture is healed. Instead of the last mentioned Needle, others use one with the obtuse End slit, like the larding Needle of Poulterers, as at *Fig. 8.* This more readily introduces the leaden Plummit, which is to be placed in the Slit, when the Needle has gone half through. Tho' this Operation is, for the most part, rather subservient to Pride and Ornament than any Use in Physic, yet if we may credit *RIVERIUS* (*Obs. 100.*) and some others, it proves of very great Consequence against several Diseases. For, says *RIVERIUS*, the Revulsion made by passing a red-hot triangular Needle through the Lobe of the Ear, and the great Discharge made by drawing a Thread of Silk or Linen through it, cannot but expel and divert peccant Humours from the Eyes, Teeth, &c. and may even vanquish a *Tabes*, and the most obstinate Disorders of the Breast. We therefore need not so much wonder some Oculists and others should have made this Operation more common of late than it was formerly; since it is not only countenanced and approved of by *RIVERIUS*, but also *PARACELSUS* and *M. A. SEVERINUS* (*Lib. de Effic. Medic. pag. 73.*) judge it to be an useful Operation to relieve an incipient Deafness.

Of Chirurgical Operations in the Nose.

C H A P. LXXI.

Of a Polypus in the Nose.

Description
and Kinds

I. **T**H E internal Parts of the Nose are, like many other Parts of the Body, frequently infested with fleshy Excrescences, which, in this Organ, we usually term *Polypuses*; though we seldom find them to have more Feet or Roots than one. Some call them *Sarcoma's*, others *HyperSarcoma's*. These Caruncles are of various Sizes, and of different Consistences: frequently they are soft, and sometimes extensible, or capable of Elongation; but, by Accident, they now and then turn out hard and rigid. Sometimes they appear paler, and sometimes redder than usual; but, in their Beginning, they are generally small, and advance gradually, though some much faster than others: and I have even observed some of them to grow so fast, that, in three or four Days Time, they have hung down out of the Nose. Usually they are not attended with Pain; but some of them, which are hard and livid, are extremely painful, inclining in some Measure to be cancerous. Some are imperceptibly concealed within the Nose, others hang out of that Organ down to the Lips; some fill up and much distend the Nose; some again appear as one Caruncle with an even Surface, and others like a Cluster^a. Some of them descend backward through the Apertures, by which we draw the Air through the Nose into the Fauces, and grow so big as to be visible behind the *Uvula*; and then they occasion not only great Difficulty of speaking and swallowing, but sometimes almost strangle the Patient. Sometimes again they extend themselves both forwards through the Nose, and backwards into the Fauces: but it is seldom that both Cavities of the Nose are thus obstructed. Generally the *Polypus* has but one Root, as we observed, which is sometimes slender, and sometimes thick, beset with large Veins; not but that one may now and then by accident meet a *Polypus* having many Roots, whence the Antients^b seem to have denominated the Disorder. Very often they arise from the lower, middle, back, and upper Part of the Nose^c, and sometimes even from the *Os ethmoides*, or adjacent Sinuses of the *Cranium*. But *Polypuses* are most frequently formed in and from the pituitary Membrane, and particularly by an Obstruction of one or more of its Glands, which being gradually enlarged by peccant Humours, at last fills the whole Nose or hangs down out of it. The Disorder therefore seems to be nothing more than a morbid

^a GLANDORP, *de Polyp.* Cap. III. will have all *Polypuses* to be unequal; which is not just, because I have seen several otherwise.

^b See CELSUS *Lib. VI. Cap. 8. No 2.*

^c FABRIC. AB AQUAPENDENTE, in *Oper. Chirurg.* Cap. *De Polypo*, will have all *Polypuses* to be annexed to the *Os spongiosum*, which I have experienced to be false.

Disposition of the spongy Production and Glands of this Membrane: So that in my Opinion this Disorder is different from those Caruncles in the Nose, which are usually termed *Sarcoma's Nasi*: for a *Polypus* is generally soft, and hangs by a slender or thick Root as by a Stalk, like a Fig^a; but a *Sarcoma* is more of a fleshy Consistence, and adheres by a large, firm, and immoveable Basis.

II. Having described the Disorder, and its Kinds, we shall now examine the State and Condition of it, with the most usual productive Causes. And, first, those *Polypuses* which appear whitish, or of a pale red, being without Pain, are of a mild Nature: whereas those are very bad which appear hard, painful, and of a black or blue Colour, or which discharge a purulent Matter, or fetid and acrid Humour, for such are tending to a cancerous Disposition. *Polypuses* often arise from internal and latent Causes, and sometimes from external injuries or Violence. By the latent internal Causes we mean an Obstruction in the small Glands and Vessels of the pituitary Membrane, from an infected or inspissated Blood and Lymph; by a Congestion of which Humours that spongy Membrane may be easily distended or tumified. Under the Causes from external Violence we may reckon violent Falls or Blows, too frequent Intrusion of the Fingers into the Nose, irritating or scratching the pituitary Glands, to which add sternutatory Powders which are too strong and acrid. Lastly, among the internal manifest Causes, are too profuse Hæmorrhages, Catarrhs or Defluxions, and Ulcers. *Sarcoma's* are produced by much the same Causes, and both of them are often attended with a *Spina Ventosa*, or Caries of the *Ossa Nasi*, of which deplorable Case I have seen several Instances.

Diagnosis
and Causes.

III. The Danger is much less, and the Cure more easy in *Polypuses* of the mild Disposition; as likewise those that are seated not very far in the Nose, being soft, pendulous, extensible, and supported by a slender Root, the Patient being also of a good Habit. On the contrary, those which are more inaccessible, supported by a large or broad Basis, and appear hard, or less capable of Elongation, such are very difficult to cure or remove, especially when the Patient is afflicted with a scorbutic or venereal Disorder at the same time. The removal of them is also attended with no small Danger from the Difficulty of suppressing the profuse Hæmorrhage, which arises after the Extirpation or Evulsion of a *Polypus*, especially one that has a broad Root or Basis: Indeed AQUAPENDENS makes slight of this Danger, but unjustly; for you should be very cautious of removing such a *Polypus*. If the *Polypus* inclines to be cancerous, that is, when it appears hard, livid, and very painful, as is not unfrequent, it will be safer for you to palliate the Disorder by a proper Regimen, Diet, and internal Medicines, since it is dangerous irritating it, like other Cancers. In like Manner when the *Polypus* is inaccessible with a broad Basis, or caused by a *Spina Ventosa*; as I remember to have seen a large one, it will be scarce possible to prevent the Tumour from growing again in a little time after its Removal, unless you first cure the *Spina Ventosa*. I know AQUAPENDENS asserts, that he never knew a *Polypus* grow up again; but this has been several Times observed by myself and others; see LE DRAN Obs. VI. When the

Prognosis.

^a GARRENGEOT writes, that a *Polypus* generally divides itself into Branches, which is contrary to Experience; for they are generally simple, as I have often seen.

Polypus extends itself into the Fauces, it proves a great Impediment both to the Speech and Deglutition, and sometimes to Respiration, even so as to suffocate the Patient, as CELSUS had long ago seen, and to be incapable of Extirpation without great Danger and Difficulty. Lastly, when the *Polypus* fills both Cavities of the Nose, it is usually much more difficult to cure, because generally attended with a worse Disorder. What has been here observed will also hold true with Regard to *Sarcoma's*, especially such as are joined with a *Spina Ventosa* of the *Ossa Narium*.

Prognosis.

IV. The Cure of a *Polypus* cannot be reasonably expected from any thing but a total Removal; which may be done two ways, either by caustic Remedies, or by proper Instruments: by either of these they may be taken off all at once, or by a bit at a time. Caustic Medicines may answer our Intentions when the Excrescence is small and soft or short, and with a broad Basis: but Care must be taken at the same Time to prevent the caustic from corroding the other sound Parts of the Nose. The mildest Escharotics are most recommended for this purpose, such as the *Pulv. Sabinæ, alum. ust. præcipitat. rub. vitriol. alb. rad. Hermodact. &c.* to be applied either alone, or mixed with Honey, or some digestive Ointment, imposed on the *Polypus* by means of a Tent, when it is seated internally; but when it appears externally, you may apply it without. POTERIUS (*Obs. 63. Cent. III.*) recommends a Powder of the Roots of *Scorpioides* or *Heliotropium*, as a very gentle Escharotic, to be introduced twice a Day into the Nose with Cotton for removing a *Polypus*, which it will do very readily, and almost without any Pain; but which of the several Species of this Plant is here intended, we are not informed. RULANDUS (*Cent. VIII. Obs. 81.*) extols a mercurial Water, with which he asserts he has cured a *Polypus* in a few Days time by wetting therewith every Morning and Evening. For this purpose are also equally efficacious the *Ung. Ægyptiac. & fusc. Wurtzii, ol. Tartar. P. D. Essent. Sabinæ, vel solutio Mercurii sublimati in Spiritu Vini*, with which last WEDELIUS writes, that he cured a *Polypus*. The *Aqua phagedænica* is also very serviceable in this Case, according to NUCKE; as also *Mercurius præcipitatus*, upon which a Quantity of *Spiritus Vini* has been deflagrated; or a Solution of *Sal ammoniacum* in Water; or the acid Spirit of that Salt, according to MUSITANUS. If none of these take effect, you may have recourse to the stronger Escharotics, as the *Lapis infernalis, Merc. sublimatus, Arcanum corallinum, &c.* But these last should be mixed with Honey or *Basilicon* before their Application, that they may not destroy the sound Parts: and if the *Polypus* lies concealed in the Nose, a small Portion of your escharotic Medicine should be conveyed to it through a Quill or other Tube. Still more powerful in consuming mild *Polypuses* are the *Spiritus & Oleum vitriol. Aq. fort. ac Butyrum Antimonii*, applied through a Tube by a Pencil, Brush, or a Feather. You must afterwards daily remove so much of the Excrescence as is eroded by the caustic at every Dressing, by a Pair of Pliers or Scissors. The eminent Surgeon formerly at Paris M. THIBAUT proceeds in the following Method: First, he defends the sound Parts near and leading to the *Polypus* with two Plasters, that they may not be injured by the caustic: then with a Tent or Pencil-brush dipt in *Butyr. Antimon.* he carefully touches the *Polypus*, and at last washes it off with warm Water, that it may not penetrate too deep into the Parts. By this method M. GARENGEOT asserts, that he completes the whole Operation in three Minutes

Minutes : but whether he applies the caustic more than once, that Author does not tell us, tho' I am persuaded its Application must be many times repeated to make an entire Destruction of the *Polypus*.

V. But in most Cases the Surgeon will find it safer to remove these Excrecences by Instruments, rather than by Caustics ; to do which there are various Methods of operating. But before you enter on the Operation, the Patient must be first prepared by a proper Regimen, Diet, and Medicines : then he must be seated against the Light, with his Head secured, inclining backward, by an Assistant : this done, you may now chuse either of the following Methods of operating, as may appear to be best suited to the Circumstances of the Case. We shall begin first with the most ancient method proposed by CELSUS in *Lib. VII. Cap. X.* where he teaches, that the *Polypus* is to be removed, and separated from the Bones by a sharp Instrument in Shape of a *Spatha*^a, taking care not to wound the Cartilage below, which would be very difficult to cure. When the Excrecence is separated, you must extract it with a Steel Hook ; and then, with Lint folded up, or a Pencil, apply some Medicine to suppress the Hæmorrhage, with which you are gently to fill the Cavity of the Nose. After the Hæmorrhage is suppressed, the Ulcer must be deterged with Lint. When it is cleansed, you may apply your epulotic Medicine with a Feather, to induce a Cicatrix ; in which Method you must continue till the Cure is completed. Not much different from this method of CELSUS is that proposed by ÆGINETA *Lib. VI. Cap. 25.* where he directs the Patient to be seated against the Light, and while the Surgeon dilates or opens the Patient's Nose, with his left Hand, with his right to pass a *Spatula* made for the Purpose in the Shape of a Myrtle Leaf, with which he must extirpate the *Polypus* by a circular Incision, applying the Edge of the Instrument against the Adhesion of the *Polypus* to the Nose ; and then to extract the Excrecence with the Handle of the same Instrument. To induce a Cicatrix he uses a Couple of leaden Pipes. That the whole *Polypus* is removed may be known partly from Inspection, and partly by the Freeness of the Voice, and the Liberty of Respiration through the Nose. The celebrated *Arabian* Physician and Surgeon ALBUCASIS directs (*Lib. II. Cap. 4.*) to extract the *Polypus* as far out of the Nose as you can with a Hook or Forceps, and then to remove it by Incision as conveniently as may be ; in which Method you are to proceed till the whole is extirpated. If you cannot thus totally remove the *Polypus*, its Remains may be destroyed by a pretty thick Cord, full of Knots at a Finger's Breadth asunder, introduced and drawn thro' the Nose, and out at the Mouth, and dressed with *Unguentum Ægyptiacum*. But FABRICIUS AB AQUAPENDENTE rejects these Methods of the Ancients upon many Accounts, and endeavours to establish a Practice of his own^b, as he says, for removing these Excrecences by Abscission with a Pair of cutting Forceps^c, which he prefers before any other Method. This Forceps he introduces gently into the Nose to the Root of the *Polypus*, which

Cure by Instruments.

I. According to CELSUS.

II. ÆGINETA.

III. ALBUCASIS.

IV. AQUAPENDENTE.

^a A Sort of Instrument of which we are ignorant ; though it is generally described to be a kind of double-edged Scalpel.

^b SEVERINUS asserts he is not the Inventor of this Method, and quotes several others who used it before him.

^c Which are figured in his *Oper. Chirurg.* Tab. III. but are different from the Forceps represented by SCULTETUS ; but it cannot be perceived how either of them should extirpate a *Polypus*.

he, by this means, cuts clean off, and then extracts it. He justly prefers this Practice as safer than the preceding Methods; and says, that when the whole *Polypus* is not taken off at the first Time, you may, on the following Days, remove more of it by a little at a Time, till it is wholly extirpated. If the Wound bleeds plentifully, which it is not so apt to do in this Method, he directs to suppress it with red Wine and Alum, of which more hereafter. We find that this Method was also practised with great Success by SENNERTUS and GLANDORPIUS, as well as by AQUAPENDENS, and I have several Times known it to succeed myself.

Other Methods of Cure.

VI. There are yet several other Methods of removing *Polypuses*. Those which are recent will sometimes shrink and disappear by repeated Punctuation or Scarification with a Scalpel or Lancet, as SEVERINUS asserts he has experienced. Some recommend the actual Cautery: but the more judicious are not forward for using it, both on account of the Torture it gives, and of the Danger there is of its injuring the sound Parts of the Nose. Some greatly prefer the falciform Scalpel of GLANDORPIUS, figured by ANDREAS A CRUCE, as the most commodious Instrument for extirpating these Excrescences, after you have extended them in a proper Manner with a Hook; but this, in my Opinion, cannot often be used with any Conveniency. MESUE amputates those which have a slender Root, and hang out of the Nose, with a Pair of Scissars; and those which descend towards the Fauces, he draws forwards with a *Tenaculum*, and cuts them off near the Root with a Pair of red hot Scissars. Others again think the Method of separating these Excrescences by Ligature to be the safest and best; especially as by this Means you avoid any profuse Hæmorrhage. For this Reason GLANDORPIUS passes a Thread of strong Silk, waxed, round the Basis or Root of the *Polypus*, and drawing it as tight as he well can, secures it with a Knot, and then cuts off the fleshy Excrescence close to the Ligature. But to perform this with more Ease and Advantage, it will be necessary to extract the *Polypus*, as far as you can out of the Nose, by the Pliers represented in *Tab. XIX. Fig. 9* or *10*. This, however, must be done gently and gradually, lest you should break off the Tumour before you have made the Ligature; which must be left upon the Part after your Abscission, till it is digested off spontaneously. And thus you cure the Disorder without running the Hazard of a profuse Hæmorrhage, which is sometimes so large as to kill the Patient, especially when the *Polypus* is removed by Evulsion, as GARENGEOT has observed in his Surgery, *Cap. de Polyp.* Others leave the *Polypus* remaining entire, after having made their Ligature, till it separates of itself together with the Thread, as I have sometimes done myself. But you ought to make a fresh Ligature on the second or third Day, if you do not perceive it to wither and decay by the first. And in this Manner I lately removed a *Polypus* from a noble Lady in the Space of four Days, without any Pain or Hæmorrhage.

My Method of curing this Disorder by Ligature.

VII. As the *Polypus* last mentioned was removed by a particular Contrivance of my own, I shall, for the Benefit of young Practitioners, give an Account of the Case, and of the Method in which I proceeded. A noble Lady above seventy Years of Age, in other respects well, having been frequently troubled with bleeding at her Nose, perceived a fleshy Caruncle sprouting up in her left Nostril, soon after the Hæmorrhage of her Nose had been stopt by cold Water: this by Degrees advanced, till it not only filled up the Nostril, but even distended and deformed her Nose to a great Degree, so that she could at last scarce draw

draw any Air through that Organ. She had consulted several neighbouring Surgeons and Physicians, who, perceiving the *Polypus* to appear externally, had treated it for a considerable Time with Escharotics, but to no Purpose: for as fast as they consumed it one Day by this Means, the Tumour grew up as much again the next; and therefore she came for my Advice and Assistance to *Helmstadt* in *March*, in the Year 1734. Upon examining the Patient I found a *Polypus* of a dark red Colour, about the Size and Shape of a *Damascene*, appearing partly out of the Nose, but concealed mostly within the Nostril, which it had greatly distended. It could not well be drawn out of the Nose, from the Rigidity and Shortness of its Root: but upon searching after the Condition of its Root with the Probe, I found it grew neither from above, nor below, but from the Middle of the Side of the Nose. Upon being asked by the Lady and her Friends, what Method I judged most convenient to remove it by, I began to think if there might not be a gentle Method of removing it by Ligature; since Caustics had been tried in vain, and to attempt its Excision or Evulsion in a Person of her Age, could by no Means be expected to succeed. I now began to contrive in what Manner I should convey my Ligature round the Basis of the *Polypus*, which, being here seated far within the Nose, and closely filling up its Cavity, made this Part of the Operation no small Difficulty. Therefore while the Patient was preparing, I invented and procured the Instrument represented in *Tab. XIX. Fig. 12.* which answered my Intention very well. Through the Aperture B in the Point of the crooked End of this Instrument I transmitted a double Thread of strong Silk; and fixing the Patient conveniently against the Light, I elevated and opened the *Pinna nasi* with my left Hand, and holding the Instrument by the Handle A in my right Hand, I conveyed its End with the Thread carefully betwixt the *Pinna* and *Polypus* upwards, and when the Thread came into View, extracted the same out of the Nose; and then gently depressing my Instrument, laid it aside, leaving the Thread behind it round the *Polypus* in the Nose; and drawing the Thread tight, I then tied it with a double Knot. The next Day I repeated the same Operation, and afterwards I made a Ligature round the root a third Time in the same Manner; by which Means the Excrescence became very hard and black: On the fourth Day the *Polypus* appearing very hard and black, I pulled the String a little, to observe whether it was loosened, and to the Admiration of the Patient and Spectators, it brought away the *Polypus* resembling a *Damascene*, without causing any Pain or Hæmorrhage. The Patient's Nose afterwards recovered its natural Figure, and she breathed through her Nostrils as freely as ever.

VIII. But it must be owned, that this Method by Ligature will not succeed when the Root of the *Polypus* is seated much farther in the Nose, or when it adheres or grows to any Sinus of the *Cranium*. Therefore, to remove these *Polypuses*, whose Roots are inaccessible, you must have a Pair of Curve Forceps according to *PIGREUS*, called a *Crow's Bill*, like that in *Tab. XIX. Fig. 9.* represented from *PALFYN*, or rather that at *Fig. 10.* whose Beak is perforated AA to hold the *Polypus* more firmly; with which Instrument you are gently to twist and extend the Excrescence till you break its Root, and then extract it. If the *Polypus* hangs down behind the *Uvula* in the Fauces, if you cannot take hold of it with the Pliers, and extirpate it with the Scissars, in the Method before

When, and
how to re-
move a Po-
lypus by E-
vulsion.

fore proposed by MESUE, you have then no other Method but gently to twist and extract the *Polypus* as we before directed, either with the crooked Forceps in *Tab. XIX. Fig. 11*, or with the Stone-Forceps, *Tab. XXVIII. Fig. 6*. in performing which you must be very careful to avoid pinching or lacerating the *Uvula* at the same Time: though we are told that M. PETIT cut off the *Velum palati* in two Places, that he might the better extract a very large and dangerous *Polypus*. See GARENGEOT de Polyp. When you find a *Polypus* extending itself both into the Nose and Fauces at the same Time, you are to remove the anterior Part of it first. See LE DRAN, *Obs. VII.*

How to suppress the Hæmorrhage.

IX. If the Flux of Blood is but gentle after removing the *Polypus*, the Surgeon may permit it to continue till it ceases of its own Accord, or suppress it by snuffing a Solution of Allum in red Wine up the Nose. But when the Hæmorrhage is profuse and dangerous, you use highly rectified *Sp. Vini*, or Vinegar, or some of the styptic Liquors and Powders we have proposed for the Bleeding of Wounds, which the Patient must draw up his Nostrils: or you must fill his Nose with Lint dipt therein, and formed into Dossils, being first secured by a Thread whereby you may extract them. The last Method is your chief Refuge in very profuse Hæmorrhages.

LE DRAN'S Method of stopping the Blood.

X. M. LE DRAN, in *Obs. VI.* proposes a new Method of restraining the Flux of Blood in this Operation, by joining a dozen or fifteen Threads together in the same Manner as for a Seton, which he conveys through the Nostril into the Fauces by the crooked Forceps, *Tab. XIX. Fig. 11*. He then extracts the End of the Thread hanging in the Fauces, through the Mouth, by a Pair of Pliers; and to this End he fastens two thick Bundles of Lint (*Bourdonets*) the first dry, and the other dipt in some styptic Liquor. After this he draws forward the Thread at the Nose, which brings the Dossils up into the Fauces and Back-part of the Nostril, so that the first Dossil of dry Lint clears the Blood from the Parts, and drives it forwards into the Nose, while the other, armed with Styptic, fastened about a Thumb's Breadth behind the former, exactly closes the Aperture of the Nose into the Fauces. Thus the Blood is prevented from running into the Mouth, *Pharynx*, or *Larynx*, so as to relieve the Patient of his troublesome Cough, and other Uneasiness it occasions: and if the anterior Part of the Nose is afterwards filled up with Lint dipt in some convenient Styptic or Liquor, upon reaching the broken Vessels, they will be contracted, and the Hæmorrhage will consequently cease.

Other Methods of Removal.

XI. ALBUCASIS, and others of the Ancients drew a Cord full of Knots through the Nose, as we before observed, not so much to stop the Blood, as to remove the Remains of the *Polypus*: they took the Cord by its two Extremities, and drew it upwards and downwards, alternately, till they thought all the Remains were cleared away: and to succeed the better in their Intention, they sometimes dipt the knotted Cord in *Ung. Ægyptiac*. And though this Practice of the Ancients is rejected as cruel and frightful by AQUAPENDENS and others, yet we find it lately renewed by M. LE DRAN, in a Case where the Root of the *Polypus* adhering to the Back-part of the Nose above the Palate, and behind the *Vomer*, could be removed by no other Method. He therefore conveyed his Seton Ligature through the Nose in the Manner before described, but without arming it with Knots, as the Ancients did, and for about twenty Days he continued to dress by his Ligature with Digestives, and then with

Desiccatives:

Desiccatives: by which Means he cured the Patient within the Space of a Month. See his *Obs.* VI.

XII. M. GARENGEOT, and some others, propose to lay open the Nose by Incision with a Scalpel, in order to extirpate such *Polypuses* as have their Roots seated in some otherwise inaccessible Part of this Organ, which is a Practice also recommended formerly by HIPPOCRATES and GUIDO DE CAULIACO. After this they cauterize the Root of the Excrescence. Which Method was also proposed formerly by CELSUS for an *Ozæna*. But for my own Part I should rather dissuade from this Practice, even in those Cases in which it might be performed, because of the great Pain, with the unsightly Cicatrix which attends it: and the rather, because when you have laid open the Nose, the *Polypus* cannot be very often removed, so as not to sprout up again; as I myself have known an Instance, as it is remarked by HUTTER of *Norimbergh*, in *Obs.* 50. of his *Chirurgical Observations*. However, when the Surgeon shall think it necessary to dilate the Cavity of the Nostrils by Incision, it will be proper to make your Incision in the Sulcus of the Nose next the Cheek, in order to render the Cicatrix less disfiguring.

Apertion of
the Nose by
Incision.

XIII. In order to heal the Wound, and prevent the Return of the *Polypus*, it will be convenient for the Patient to snuff up his Nose a Mixture of *Sp. Vini* Cure of the Wound. *cum Mell. Rosar. & Aq. Calc. portuuncula*, or to inject the same by a Syringe, or else to fill the Cavity of the Nose with Lint dipt in it, which Treatment is to be continued for several Days. But if we can perceive any Part of the *Polypus* remaining, it must be removed either by the Scissars, or else taken down with *Ung. Ægypt.* mixed with the preceding Injection: and, in some Cases, you may touch it now and then with *Lap. infern.* where that may be done with Safety, filling the Cavity of the Nose with Lint, so as to compress the circumjacent Parts, and prevent the the sprouting up of a new *Polypus*. In the mean Time the Patient should be kept under a proper Regimen in Diet, and supplied with convenient internal Medicines to correct the State of his Juices; particularly bleeding, purging, Mercurials, and a Decoction of the Woods ought not to be neglected.

XIV. When the *Polypus* inclines to be cancerous, it will neither be convenient to irritate it with Instruments or Medicines: it should be rather palliated and prevented from inducing worse Consequences, by ordering a proper Diet, and Course of internal Medicines, as we proposed in Part I. Book IV. Chap. XVI. N° VI. and Chap. XVII. N° XI. Lastly, when a *Sarcoma* is found in the Cavity of the Nose, it is to be treated in the Manner we have here directed for a *Polypus*, taking in the Assistance of internal Medicines at the same Time. But if all these Means prove ineffectual, the Disorder is to be relinquished as incurable, especially when it proceeds from an obstinate *Spina Ventosa*. You will meet with various Observations from Authors on this Disorder collected by GLANDORPIUS, in his Treatise on the Subject, with two considerable Observations in LE DRAN, *Obs.* VI. and VII.

Cancerous
Polypi and
Sarcomata.

C H A P. LXXII.

Of an Ozæna.

An Ozæna
described.

THE internal Surface of the Nose is sometimes ulcerated, and discharges a corrupt Matter with Bits of carious Bones, and a very fetid Smell. This Disorder is usually denominated an *Ozæna*, or foul and malignant Ulcer of the Nose, which is easily distinguishable by its *Fætor* from those slight Ulcerations of this Part, that proceed from a Defluxion of Humours, or the Inclemency of the Air, and are easily cured with a little *Ung. Cerus*. An *Ozæna* is usually the most obstinate and malignant, when accompanied with a Caries in the Bones of the Nose. For tho' in the Beginning of the Disorder the Ulceration affects only the internal Membranes, yet by Degrees it extends itself into the slender Bones of the Nose, and frequently into the Sinuses of the *Cranium* and *Ossa maxillaria*, producing an incorrigible Caries.

Causes of
the Disorder.

II. An *Ozæna* generally proceeds from an inveterate Catarrh, or some other Disorder in the Nose; especially when the Patient's Blood is at the same Time affected with the Scurvy, or venereal Disease. But it may sometimes proceed from acrimonious or caustic Substances drawn into the Nose together with the Air; sometimes it also proceeds from, or is joined with, a *Polypus* in this Part, which I have seen myself: it is mentioned also by GLANDORPIUS de Polyp.

Diagnosis
and Prognosis.

III. The Signs of an *Ozæna*, by which it may be discovered, are chiefly those at N^o I. preceding. But for the Event of it, it is to be observed as one of those Disorders which admit of a Cure with great Difficulty; because the Bones of the Nose, especially the *Ossa spongiosa*, in which it is seated, are not only of a slight Texture, but are also not within the Sight or Reach of the Surgeon's Instruments, to be thereby properly dressed and cleansed. On this Account the Disorder the sooner spreads itself, and at length destroys not only the *Septum*, and other thin Bones within the Nose, but also at length eats away the Cartilages, or external Nose, so as greatly to disfigure the Patient, and impede his Respiration and Speech.

Cure by Internals.

IV. To cure this Disorder, you ought therefore to have immediate Recourse to Medicines both external and internal; especially the last, which should be such as correct the Blood, and rectify a depraved Habit of Body, often termed *Antivenereals*, of which Mercurials, and Decoctions of the Woods, are the chief. The Patients Diet should in the mean Time be spare and light, and without seasoning; and, when the Case is venereal, nothing proves so effectual as a Salivation.

Cure by Externals.

V. Externally you must apply such Topicals as are usually prescribed to deterge Ulcers; chiefly such as the *Aq. virid.* HARTMANNI snuffed or injected every Day up the Nose, or applied with Tents or Linnen-rags rolled up. I have sometimes used a Mixture of *Aq. calc. cum Merc. dulc.* with good Success. MAYERN and FALLOPIUS extol mild *Aq. aluminosa*; which, according to FALLOPIUS, is thus prepared:

℞ *Aq. Plantag. & rosar. ana ℥ ss.*

Alum. & Mercur. sublimat. ana ʒj. m.

You will also find great Benefit, in the worst Kind of the Disorder, from a Decoction of *Savin* and *Scordium*, in a Pound of which you are to dissolve about an Ounce of the *Ung. fusc. Wurtzii*; or an Injection of *Sp. Vini cum Mell. Rosar. & Ung. Ægyptiac. aut fusc. Wurtz.* used warm. Others again extol the Use of Tents spread with the *Ung. fusc. Wurtz.* mixed with a little *Vitriol. alb.* to be inserted into the Nose, till the Ulcer is cleansed, and its Stench removed. Lastly, fumigating the internal Parts of the Nose with *Cinnabar* cast upon a hot Iron, or live Coals, will very often conduce greatly to the Cure of an *Ozæna*; in the Use of which Medicines you are to continue at least till the Stench and Discharge of corrupt Matter cease. This Fumigation is recommended by MAYERN not only in the *Ozæna*, but in all obstinate Ulcers of the Jaws and Palate, injected at the Mouth cautiously, and in small Quantities.

VI. When the *Ozæna* is accompanied with a Caries, the Disorder is hardly curable before you have obtained a Separation of the carious Bone, which is the chief Step towards the Cure of this Species of the *Ozæna*. And here Nature is the principal Performer. But in what Manner we are to extirpate a carious Part of the *Ossa spongiosa* in the Nose, Surgeons have not yet been able to inform us, since neither Cautery nor Caustic, nor any thing stronger than the Medicines before prescribed, can be safely used in this Organ. In the mean Time the Surgeon must endeavour to deterge the Parts, and do what he can by the Use of those Remedies continued for some Weeks or Months, till the carious Bone is cast off; which, when loose, may be extracted before that Time by a Pair of Pliers, to prevent the Caries from spreading into the Parts in Contact. But if the carious Bone proves too large to be thus conveniently extracted entire, it may be first divided with a Pair of Scissars, as I have sometimes done myself; after which you must persist in the above mentioned Remedies till the corrupt Parts are deterged, and the *Factor* removed.

Cure of an
Ozæna with
Caries.

VII. We meet with a new Method of treating a particular Species of the *Ozæna* described in the Anatomy of Dr. DRAKE; in which the Ulcer is seated in the *Antrum Highmorianum*, or Sinus of the upper Jaw, discovering itself chiefly by the disagreeable Smell and corrupt Matter, which runs out of the Nose upon inclining the Head on the sound Side, because in that Posture the Matter is turned out of the *maxillary Sinus*. But as we are not able by this, or any other Means, to clear the Matter from the Sinus, this Species of the Disorder frequently remains incurable, and at length destroys the Patient: for whose Relief Dr. DRAKE^a has supplied us not only with a true Notion of the Disorder, but also with a new Method of curing it as follows: Being assured that the *Ozæna* is fixed in the *Antrum*, he orders one of the molar Teeth of the affected Side to be extracted, and then to break through the Socket, into the Sinus by a Probe, or other sharp-pointed Instrument, like that represented in *Tab. VII. Fig. 2.* which, he says, may be generally performed without much Difficulty, because this Part of the Bone is usually much decayed or eroded by the retained Matter. Having thus made an Opening into the *Sinus*, you have not only a ready Discharge of the Offending Matter, but may also afterwards deterge

DRAKE'S
Method for
the Ozæna
in Antre.

^a This Method of treating an *Ozæna*, with several other Cases in DRAKE'S *Anatomy*, are said to have been inserted by the celebrated Anatomist and Surgeon Mr. COWPER; but how justly, I must leave others to determine.

and heal the Parts affected, by throwing in proper Injections, composed of *Elix. prop. vel Tinct. Myrrh. & Alo.* either alone or mixed with a Decoction of *Scordium* or *Savin*, with some *Mel. Rosar.* After your Medicine is injected into the *Sinus*, you must retain it there some Time, by immediately stopping up the Aperture in the Gums by a Tent; after removing which, and discharging the Injection, you must insert another Tent fastened to a Thread, and intended to keep the Passage from closing up before the Ulcer is deterged and healed in the *Antrum*. The Success of this Practice is confirmed by repeated Experience: and it is remarkable, that the upper Jaw-Bone is sometimes so much eroded by the confined Matter, that a great Part of it comes away together with the Tooth extracted. So that you need not make any Aperture into the *Sinus*, that being, by this Means, already performed to your Hand: and you have nothing more to do, than treat the Ulcer with Detergents and Balsamics to compleat the Cure. See CELSUS on *Ozænas* and ulcerated Noses.

C H A P. LXXIII.

Of Artificial Noses.

WE have already directed in what Manner you are to replace and conjoin a Nose which has been almost quite separated from the Face by a Wound, Bite, or any sharp Instrument, in Part I. Book I. Chap. XIII. N^o VIII. but we have not yet acquainted you with the Method of cutting out a new Nose from some fleshy Part of the Body, and of conjoining it on the Face instead of the true Nose, which was cut or torn off. TALIAHOTIUS has a professed Treatise on the Subject, illustrated with many Figures, and entitled, *Chirurgia Curtorum per Infitionem*: yet what is there proposed by this Author, is, for want of later Experiments and Observations, judged to be impracticable, and without Foundation, by our modern Surgeons. When this Member is lost, we must supply its Defect with an artificial Nose of Wood or Silver, unless, by being on the Spot, you can instantly replace and conjoin the real Nose just separated, either by Suture or Plasters. Such an artificial Nose, painted to the Life, and adapted by proper Springs and Screws, may render the Accident and Deformity imperceptible. ROONHUYB, *Obs. Chirurg.* XXIV. gives an Instance of a Nose slit down longitudinally, and cured by Suture. M. BLEGENY in *Zod. Med. Gall.* An. 1680. speaks of a Soldier, whose Nose was cut quite off by a Scymetar, and sewed on again afterwards so well by the Surgeon, that you could scarce perceive the Scar. And M. GARENGEOT, in Tom. III. of his *Surgery*, Pag. 55. Chap. On a Polypus, gives an Account of a Nose that was conjoined again by Suture, after it was bit off.

C H A P. LXXIV.

Of Opening the Nostrils preternaturally closed.

I. **I** Do not remember to have ever met with an Instance in Chirurgical Writers, of the Nostrils being preternaturally closed or concreted, and afterwards rectified by Surgery, except only in BARTHOLIN. *Act. Hafn.* Vol. I. Pag. 199. But that such Cases do sometimes happen, and that they are curable by the Hands and Instruments, is apparent from the following Account. A poor Infant was brought to me at *Helmstadt*, Anno 1721, of about three Years old, who, for want of Care and proper Attendance in the Small Pox, a Misfortune to which many poor People are liable, had been grievously ulcerated all over its Face, and more particularly in its Nose and Lips, whereby the Nostrils were collapsed or closed, and concreted so strongly to the upper Lip which turned back, that there was no Possibility of shutting the Mouth, as in *Tab. XIX. Fig. 14. AA.* The right Nostril was totally occluded, and the left so contracted and closed, that it would not admit the Head of a small Pin: whence the Infant was often troubled with such a difficult Respiration in Sleep, that the Parents were afraid every Moment that it would be suffocated.

II. In this Case I proceeded as follows: having placed its Head against the Light, and ordered its Hands and Legs to be held by an Assistant, I first separated the upper Lip from the right Side of the Nose by the Scalpel, and then with a smaller Scalpel I made an Opening through both the right and left Nostril, almost as large as the natural. I next examined the State of the Parts within the Nose by the Probe, *Tab. I. Fig. K*, and farther enlarged the Openings, and freed the Parts by the Scalpel, according as I found necessary. After having in this Manner opened the Nostrils, when they had bled a while, I inserted a pretty thick Tent of Linen into each, which both restrained the Hæmorrhage, and kept the Aperture from closing at the same Time. This done, in order to restore the upper Lip to its former and natural Position, I placed a Dossil of Lint with a Plaster, and an oblong narrow Compress at the Bottom of the Nose to depress the Lip, and then secured the whole Dressings by the Sling with four Heads, applied in the same Manner as for the Hare-lip. This Method of Dressing was continued for several Days, only the nasal Tents were usually dipt in *Sp. Vini*: by which Means I restored both Lip and Nostrils to their Healthy State within eight Days time.

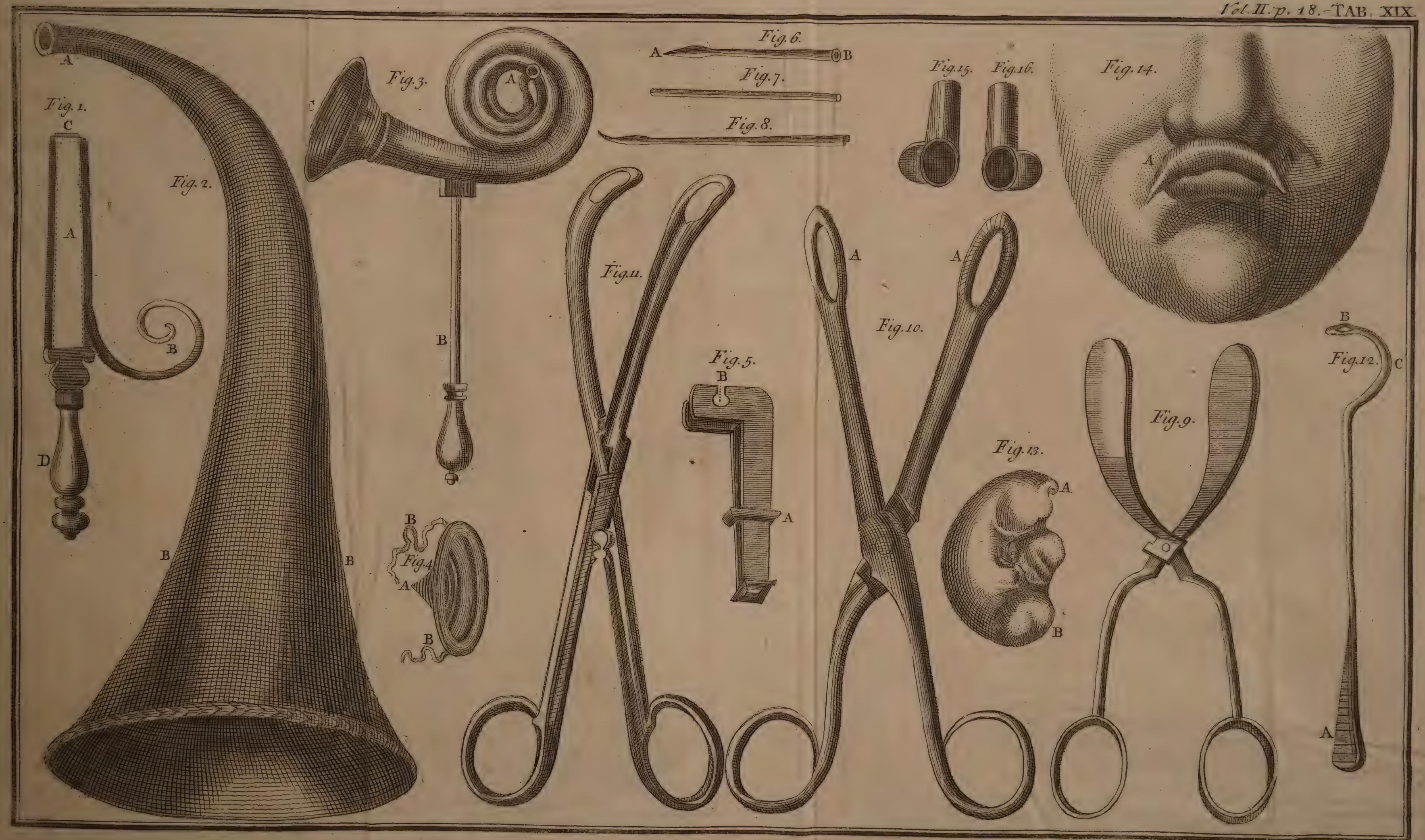
III. When the Infant appeared almost well, the negligent poor Mother removed the Tents from the Nostrils, and did not bring it, as usual, for me to renew the Dressings; in consequence of which the Nostrils again collapsed and coalesced, so as scarcely to admit a slender Probe. The Mother now therefore acknowledges her Fault, and implores my Assistance a second Time: whereupon I opened the Nostrils by the Scalpel, as before, and, instead of the Tents, introduced two leaden Pipes contrived for this Purpose (*Tab. XIX. Fig. 15 and 16.*) with which both the Nostrils were kept open, and of their proper Dimension, till the Wound was completely healed and cicatrized.

Other Instances.

IV. I performed another Cure of this kind upon a little Girl belonging to a Peasant, in the Year 1725, whose Disorder arising in like Manner after the Small Pox, I treated it in the same Method. I have since had a third Child brought to me at *Helmstadt*, afflicted with the same Accident; in the Cure of which I substituted Brass Tubes for those of Lead, which are easily compressed and deformed. In the Cure of this Disorder, Care must be taken to dilate and keep open the Nostrils for a considerable Time, even till after the Wound is cicatrized; otherwise, if you remove them too early, the Nostrils will be surprizingly contracted, though they appeared very large, and sufficiently dilated before.

An EXPLANATION of the NINETEENTH PLATE.

- Fig. 1.* Is a Steel Instrument, with its Tube, to cauterise behind the *Antitragus* of the Ear for the Tooth-ach. A the Tube, B its Handle, C the Catery appearing through the Tube, D the Handle.
- Fig. 2.* Represents an acoustic Instrument, to help those who are hard of Hearing, made in the Shape of a Horn or Trumpet; the small End A being inserted into the Ear, the broad End BB receives, collects, and concentrates the Sound, so as greatly to augment the Hearing.
- Fig. 3.* Is another Instrument for the same Use, having its Tube convoluted.
- Fig. 4.* Represents DEKKERS's acoustic Instrument made of Silver: A the turbinated or Shell-part of this is applied to the Ear, round which it is fastened under the Wig or Hair by the Strings BB, without either being seen, or the Trouble of holding it in your Hand.
- Fig. 5.* Is an Instrument to hold the Lobes of the Ears with in boring them.
- Fig. 6.* Denotes a Needle of Silver or Steel, sharp-pointed at one End A, and hollow at the other End B, that it may both perforate the Lobe of the Ear, and introduce the leaden Plummit, *Fig. 7.* at the same Time.
- Fig. 8.* Is another Needle for the same Purpose, but slit at one End like a larding Needle, that it may introduce the leaden Plummit, *Fig. 7.*
- Fig. 9.* Represents a Pair of arched *Forceps*, from PALFIN, for extracting a *Polypus* of the Nose.
- Fig. 10.* A Pair of Pliers for the same Use, but perforated at their Ends, that they may hold the *Polypus* more firmly.
- Fig. 11.* Denotes another Pair of Pliers, perforated at their Ends like the former, but made a little crooked, that they may twist off and extract *Polypuses* growing in the *Fauces*, and posterior Part of the Nose.
- Fig. 12.* Is an Instrument I contrived to pass a String round the Root of a *Polypus*, to remove it by Ligature, according to Chap. LXXI. N^o VII.
- Fig. 13.* Represents the *Polypus* I removed by a Ligature, made with the preceding Instrument, *Fig. 12.* A the Root which grew to the Middle of the external Side of the right Nostril, B the Extremity of it which appeared out at the Nose.
- Fig. 14.* Denotes Part of the Face, in which the Nostrils were concreted, and the upper Lip turned back, and joined to the Nose.
- Fig. 15.* and *16.* Represent two Pipes of Lead or Brass, furnished with Wings, to dilate and keep open the Nostrils, *Fig. 15* for the right, and *16* for the left, in the Cure of the disordered Face, *Fig. 14.* Of



Of Chirurgical Operations on the Lips.

C H A P. LXXV.

Of the Hare-Lip.

I. **I**N some People we observe the upper Lip in a Manner slit or divided ^{a, Description.} so as to resemble the upper Lip of a Hare, as in *Tab. XX. Fig. 1.* of which kind I lately observed and cured one: This Disorder is therefore called the Hare-lip from its Similitude to the same Part in that Animal. Sometimes the Division is so large, that one would imagine Part of the Lip to be wanting; and sometimes again the Fissure or Division is double, so as to resemble the Letter M, and then the Patient is said to have a double Hare-Lip. In Infants this Disorder obstructs their Sucking, as it does the Speech in Adults. Sometimes a like Fissure is observed in the lower Lip, from a Wound which has been neglected, or improperly treated: and this last Species of the Disorder is termed the spurious Hare-Lip. In the true Kind, which is born with the Infant, the Palate itself is often divided either in Part, or all along to the Nose and *Uvula*, which last Part I have frequently observed to be wanting. Hence, when the external Hare-Lip has been cured, the internal Fissure of the Palate remains incurable notwithstanding, which greatly impedes and vitiates the Formation of the Voice and Speech. The less and more equal the Fissure of the external Hair-Lip is, it is generally so much the more easy to be cured; and the more difficult, as it is larger and more unequal. In some Infants the Division of their Lip is so large and irregular, that one can have little Hopes of a Cure, which may however be very easily performed on the very same Lip, when adult. So also the double Hare-Lip is very difficult to cure, from the Largeness of the Fissure, and other Circumstances. Sometimes too we meet with a Tooth, or Part of the lower Jaw projecting forward into the Fissure, which cannot be cured, unless they are first removed.

II. In a recent Hair-Lip, or one which is made by a Wound, you must attempt the Cure by the knotted Suture, as we directed in Wounds. But when ^{The Opera-} Part of the Lip is wanting, your Operation must be made with Needles, as in the true Hair-Lip. In this Operation therefore we do not attempt to supply any Part that is wanting, but only to unite those which are divided, which cannot be performed without scarifying, and taking off the Skin from the Edges of the Fissure, the Performance of which requires great Circumspection: and therefore we shall briefly and plainly describe the best Method of performing this Operation. And first in regard to the Season, you should chuse the temperate one of the Spring or Autumn, but rather the first, observing that your Patient is not troubled with any other Disorder at the same Time: and if

^a In M. GARENGEOT's Figure you cannot perceive any Fissure or Division in the Lip, but it appears entire.

he is, to remove that Disorder first. In the next Place, your Patient is to be prepared by a proper Diet, and the Use of lenient Purges, continued for some Time before the Operation, which must be performed in a light Apartment, and will require the following *Apparatus*: a Pair of Scissars, *Tab. I. Lit. C.* and some Needles, *Tab. IV. Fig. 21, 22. or Tab. XX. Fig. 2, 3, 4, 5,* made of Gold, Silver, or Brass, provided they are triangular, and sufficiently sharp at the Point, as at *Fig. 2.* or else flat, as at *Fig. 3, 4, 5,* that they may more easily enter through the Lips. Steel Needles are less convenient, because they rust, and cannot be easily extracted without causing Pain and Laceration. You must also provide some strong Silk, a Vessel full of warm Water, with a Sponge, some Lint, Balsam, and a Fillet: or if Part of the Jaw or a Tooth protrudes itself, you must then add a suitable Pair of *Forceps* for their Removal. Lastly, you must not want *Hungary Water*, or some other Cordial, to recover or chear up the Patient: all which being provided in order, you may then proceed on the Operation as follows. If the Patient be an Adult, he must be seated against the Light, with his Head secured by an Assistant: but if it be an Infant, upon whom this Operation is most frequently performed, it must be laid upon the Lap of a strong Man, with the Hands and Feet secured, each by an Assistant. When the Fissure appears large or deep, so that the two Parts of the Lip cannot be easily conjoined, it will be necessary first to divide the *Frenulum* of the upper Lip from the Gums with a Pair of Scissars, but without wounding the Gums, or uncovering the Jaw. The Operator now removes the external Skin of the Fissure with the Scissars, taking it off very cleanly, especially in the upper Part, without which they will not intimately unite. The raw Lips are now cleansed with a Sponge, and then held close together by an Assistant, while the Surgeon passes through them one, two, or three Needles, according to the Age or Size of the Patient; so that they may enter and come out of the Lips at about the Distance of a Goose-Quill from the Fissure: for when they are passed through nearer to the Fissure, they do not hold strong enough, but will tear out, especially in Infants who are apt to cry. The Needles are to be entered from the right towards the left, beginning with the first at the upper Part of the Fissure, and inserting them at about a Straw's Breadth from each other. But in passing the Needles through the Lips of Adults, which are often very compact, you may sometimes have Occasion for a Needle-Case, *Tab. VI. Fig. 2, 3.* to sustain the Lips of the Wound against the Point of the Needle: though this may be generally done by the Fingers, which is my constant Practice.

Ligation of
the Thread.

III. Having thus entered your Needles, and cleansed the bleeding Lips with a Sponge, you then take a Piece of strong Thread or Silk waxed, and, fastening it about one End of the Needle, you proceed with it either circularly, or like the Figure ∞ , as in *Tab. IV. Fig. 21, 22, Tab. XX. Fig. 5.* by which Means the Margin of the Lips are brought close together, and the Thread at last secured by a Knot. It is now the Practice of some to break off the Points of the Needles with a Pair of Pliers, that they may not project above the Breadth of a Goose-Quill beyond the Ligature so as to prick the Lip, and produce Pain and Inflammation. But this is not necessary when the Needles are short, or when they are secured with a Piece of Rag or Sponge; but

but, on the contrary, the Cure generally succeeds better in this Manner, without being attended with any bad Accidents, from the Irritation of the Wound.

IV. Your Dressing must now be made with soft Lint dipt in *Mel. Rosar.* and Dressings, applied according to the common Method, betwixt the Gums and Lip, to heal the Wound internally: which Practice may be followed well enough in Adults, but not in Infants. For in the first Place these tender Patients won't easily admit of such Applications: and by their Resistance and Cries the Lips of the Wound will be torn asunder. Besides, there is great Danger of the Lint dropping from the Gums and falling into the Throat; which may bring on violent Coughings, Vomitings, and sometimes Suffocation: for which Reasons I would by all Means omit it. The external Part of the Wound is at the same Time dressed with *Bals. Peruv.* or some other vulnerary Unguent, covered with Lint and a Compress, and, if you please, a sticking Plaster with four Heads, as in *Tab. II. Fig. d*; two of which are fastened upon the left Side of the Lip, and two on the right, the whole being secured by a Sling with four Heads, or a Simple Fillet with two Heads, whose Extremities may be fastened about the Head either by a Knot or Pins. Some Surgeons indeed use the uniting Bandage, *Tab. II. Fig. f*, to conjoin the Parts of the Hare-Lip, after they have been dressed with a Plaster. But this, I think, will do more Harm than Good, by pressing the Needles too forcibly: and as nothing more is required than barely to keep the Dressings on the Wound, the first mentioned Bandage will answer the Intention very well. GARENGEOT advises to bleed the Patient two or three Times after the Operation: but no Reason being offered for this Practice, I think it may be better omitted, as I have always done, and yet not without Success.

V. It has been an Opinion of the Ancients, that it is not safe to perform the Operation for a Hare-Lip upon Infants, before they are two Years of Age, or even till they are four or five, according to GARENGEOT. The contrary of which is taught by Experience, from whence we are furnished with Instances of Infants happily cured of a Hare-Lip, when they have not been above five or six, or even three Months old, if they are well in other Respects, and the Operation rightly performed. Besides, Parents are seldom willing to defer the Operation so long: And I have known them so uneasy on this Account that they would rather employ an itinerant Quack in the Operation, than postpone it for any Time: nor indeed have these Mountebanks often miscarried. It is disagreeable to Parents in general, that their Children should appear with such a Blemish: and it is often of bad Consequence to the Mother in succeeding Pregnancies to have such Objects in their Presence; by which Means the Deformity is propagated in the Family. Therefore I would advise expert Surgeons not to be afraid of performing this Operation too early, especially when the Fissure is but small. It is also a necessary Circumstance in Infants, to keep them from sleeping a considerable Time before the Operation; and afterwards to give them an Anodyne, that they may sleep the beter, and lie still the longer after the Operation without moving the Lips by crying. It should also be observed, rather to let the Infant lie with its Face downward during the Operation, that the Blood may not run down its Throat, and set it a coughing. And though the Hæmorrhage is often pretty plentiful in performing this Operation in young Infants, yet no Danger can be well expected from thence ::

thence : for it rather prevents Inflammation, and generally ceases after applying the Bandage and Dressing upon the Lip.

Some use
Tenacula.

VI. But to lessen the Hæmorrhage, and proceed more conveniently in this Operation, some Surgeons think it necessary to be furnished with some *Tenacula*, to hold the Lip on each Side the Fissure, before you remove the Skin by the Scalpel or Scissars, see *Tab. XX. Fig. 6, 7.* which though they seem adapted to make a neater Wound and *Cicatrix*, yet they are scarcely ever used. In Infants who have a Fissure in the Palate, and in those who are more adult, there is frequently a Protuberance of the upper Jaw, or else a large Tooth starts forward through the Fissure, and which must therefore be either extracted or removed before the Operation.

What is to
be observed
in renewing
the Dressings.

VII. The Dressings ought not to be removed before the third Day, unless it be required by some Accident, and then they must be taken off cautiously, to avoid separating the Parts in Contact. In the mean Time the Part should be anointed with Syrup of Violets, or Honey of Roses: and, if the Dressings adhere, they should be first moistened with warm Wine; and when the Thread appears relaxed, so as not to retain the Lips of the Wound close together, a new Thread should be fastened round the Needles, to conjoin them more closely. But when every thing succeeds well, the Operator has little more to do than to dress with some vulnerary Balsam. If the Lips of the Wound appear conjoined three or four Days after the Operation, you may then venture to extract the middle Needle when there are three, or the upper one when there are two only. By which Means the Threads will separate freely of themselves; and the Cure may be completed by dressing every Day with *Mel. Rosar.* or some vulnerary Balsam, with a sticking Plaster and uniting Bandage. Lastly, to facilitate and promote the Cure, the Patient ought to be dieted upon Broths, Emulsions, Milk, Jellies, and such like Substances, which do not require any Mastication, and to restrain from loud Talking. In young Infants moisten the Bottom of the Lip with a Feather dipt in *Mel. Rosar. vel Syr. Violar.* which will both heal and excite the Infant to lick that Part, and promote the Cure.

Method
used by
Mountebanks.

VIII. Many *German Quacks* and *Mountebanks* frequently retain the Lips of the Wound together by strong Thread passed through them instead of Needles, after which they tie the Ends of the Thread in the same Manner as we directed for the knotted Suture in Part I. Book I. Chap. VI. N^o III. They observe the same Order in tying the Threads as other Surgeons do in making the Ligature about the Needles, making no Difference in their other Dressings, and the Remainder of the Cure: at last they cut the middle Thread on the third or fourth Day, as they do the uppermost upon the fifth, and the lowermost on the sixth or seventh Day; and thus they frequently succeed, (as *WEDELIUS* and myself have often observed) and perform good Cures, though in an awkward Manner, and by obtuse and unfit Instruments, especially when the Fissure is but small; for when it is large, this Method will hardly succeed.

Cautions
and Observations.

IX. We shall now subjoin a few necessary Cautions and Observations concerning this Disorder. As, 1. When the Skin in the upper Angle of the Fissure is not clean cut out, that Part will not unite, though it may be consolidated below, so that it will form a Sort of an *Hiatus* or *Foramen*: to prevent which it will be proper to leave none of the Skin behind. 2. If by neglecting this Caution

tion a *Foramen* should be left above, when the Parts are healed below, there is no better Method of curing it than by cutting out the *Cicatrix* entirely by a double Incision, closing the Wound afterwards with a Needle and Ligature. In this Manner I cured two young Girls of such an *Hiatus*, which had been left in the Lip after the Cure by the Operation performed by Mountebanks. 3. When the Palate is also slit, and the Fissure of the Lip extends itself into the Nose, as in *Tab. XX. Fig. 1.* the forementioned Cautions are superfluous. 4. In the double Hair-Lip the four Sides of the Fissure are to be cut off, and then conjoined by long Needles and Ligature. 5. Some direct, with PALFYN and ROONHUYNS to loosen the Threads about the Needles on the second or third Day; but as those Threads usually adhere to each other, and to the Wound or Needles, by Means of the Blood or Balsam, they cannot be removed without Pain and Injury to the Patients, especially Infants and Children: and therefore I should advise you to omit removing the Threads till they separate of themselves after extracting the Needles; except some Inflammation, or other Accident, should require it. 6. I sometimes use a Sling with two or three Hooks, as in *Tab. IV. Fig. 4.* which being fixed round the Head, and upon the Corners of the Lips, they are by this Means drawn backward. In the next Place, after the Needles are encompassed with the Thread, I then fasten another strong Thread to the Hook on each Side, and passing them round the Needles, make an Extension towards each Side of the Mouth, by which Means the Lips of the Wound are better secured than in any other Method. 7. Some direct to support and extend the Lip with one Hand, while you cut off the Skin by the Scissars with the other; but as in this Method, the lower Part of the Lip will be more tense than the other, it will be more liable to the Incision, so as to make the Wound too large and unequal; and therefore I think it better not to touch the Lip with your Fingers, but only to remove the Margin of it by the Scissars. 8. M. PETIT has invented a Needle for this Operation almost like the larding Needle used in Kitchens, *Tab. XX. Fig. 8.* By whose obtuse End being slit A. and passed through the Lips of the Wound, he introduces the *Fibula*, *Fig. 9.* made of Silver with two Heads, which is left in the Wound after the Needle is extracted: and then he ties round the Thread about the *Fibulæ* instead of the Needles, to conjoin the bleeding Lips; which Method I have known to answer very well. But I use Silver *Fibulæ* made each, either with none, or but one Head, as that at *Fig. 10.* that they might be more easily extracted; for those Heads must cause Resistance against the Parts. I also think his Needles are too large and thick, and should therefore rather approve of those *Tab. XIX. Fig. 8. 9.* If an Inflammation or Fever with Convulsions should supervene after the Operation; I must advise you, with M. GARENGEOT, to remove the *Apparatus*. 10. But when a large Part of the Lip, or Teeth are wanting in Adults, so as not to be able to support the *Fibula*, you must then fix a Plate of Lead under the Lip. Lastly, it is surprizing that HILCANUS should have nothing upon the Hare-Lip among all his 600 *Chirurgical Observations*, which he has published.

C H A P. LXXVI.

Of a Cancer in the Mouth and Lips.

Description. I. **T**H E R E are two Species of Cancers in the Lips, as in other Parts of the Body, viz. latent and ulcerated. By a latent Cancer is meant a hard, painful, and inflammatory Tumour in the Lip. The ulcerated Cancer is when the Tumour degenerates into a spreading fetid Ulcer, discharging an acrimonious offensive Matter, which corrodes not only the Lips, but every Part of the Face it touches. This Species of the Cancer is generally seated in the lower Lip, as it is represented in *Tab. XX. Fig. 21. a a a.*

Causes. II. This lamentable Disorder commonly arises, like other Cancers from a peculiar Acrimony in the Blood, and an Obstruction of the spongy Glands in this Part; from whence proceeds a livid and painful Tumour or Wart, that by Degrees turns to an open Cancer or malignant Ulcer, which quickly divides the Lip as if it were slit, as at *Fig. 11.* This Disorder may also frequently arise in bad Habits from an accidental Blow, Bite, or Puncture of the Lip, &c.

Prognosis. III. The Use of Medicines in this Case is generally of little or no Service; and almost the only Relief that can be expected and hoped for must be had from the Knife. If this be not applied in Time, there will be great Danger of the Disorder spreading itself into the other Glands of the Neck, Mouth and Fauces, so as to strangle the unhappy Patient, as I have sometimes observed. But when the vitiated Parts are timely removed, there may be then some Hopes of a Cure; especially if the offending Humours in the Blood are at the same Time corrected, and carried off by a proper Diet and Medicines: which, being generally extremely difficult to obtain, is frequently the Cause of the Disorder returning again soon after. However, the Disorder is more likely to be cured in young than in old Patients, and in those the most easily curable are such as proceed from external Causes and most dangerous and obstinate, when they owe their Rise to an acrid and vitiated Blood.

Cure when from, i. a Fissure. IV. The Cure of a Cancer in the Lips is to be performed in different Methods, according to the particular Condition of the Disorder. For, 1. when only a small Chop or Fissure infests the upper Part of the Lip like a painful and inflammatory Ulcuscle, the Cause of the Disorder being external, from cold, or the like, it may then be proper to treat it with *Mel. Rosar. Bals. Peruv.* or *Ung. Saturnin. seu Diapomphol. cum Merc. pauxillo*, and afterwards to cover it with a Plate of Lead that has been rubbed with Mercury, or with a Piece of *Emplast. Diapalma* continued and renewed till the Disorder disappears. In the mean Time a proper Regimen, Diet, and Course of Medicines, ought not to be neglected. I have by Experience learned, that the Liquor express'd from rotten Apples, and mixed with *Merc. dulc.* assisted with internal Medicines, afforded great Relief to a certain young Woman troubled with this Disorder. We also read of a Cancer in the Mouth cured by *Vitriol. cerul.* either with or without Olive Oil, *Ephem. nat. curios. Cent. 6. Obs. 43.* But when neither these nor other Medicines afford any Relief, and we perceive the Disorder growing daily worse and worse, the chief and only Remedy is to extirpate the indurated and cancerous Part of the Lip by two or three Incisions with a Scalpel or Lancet, observing

observing rather to remove some of the sound Parts, than to leave the least Bit of the Cancer behind, which LE DRAN confirms: and then you may conjoin the Lips by two Needles or *Fibulae*, like as in the Hare-lip; or when the Fissure is but small, by the *Sutura nodosa*. By this Method I succeeded in curing the Cancer represented in *Tab. XX. Fig. 11.*

V. But when the Cancer of the Mouth is not yet ulcerated, but infests that Part of the Lip next the Skin with a very hard and painful Tumour, you are in that Case advised by some Physicians to remove it by Escharotics, healing up the Wound after the Tumour is destroyed. This Practice may indeed succeed sometimes, when the Cancer proceeds only from external Causes, or an encysted Tumour: but as the Application of Caustics is generally dangerous in these Cancers, I should rather advise, with the most prudent Physicians, to extirpate the same by the Scalpel or Scissars. There are two Methods of amputating these Cancers, according to their particular Natures: for those which are moveable, you are to make an Incision through the Skin with a Scalpel; and, after freeing the Tubercle from its Adhesions with the Knife or Scissars, the Wound is then to be healed in the usual Manner. But such as are fixed and immoveable are to be extirpated together with Part of the Lip in which they were contained, treating the Wound afterwards by Suture as in the Hare-Lip. But in whatever Method you proceed to cure the Patient, it will be all to no Purpose, if he does not observe a proper Regimen of Diet and Medicines, with Bleeding and lenient Purges, to prevent a speedy Return of the Disorder, which I have observed oftener in this Case than in a Cancer of the Breast. See SCULTETUS *Obs.* 33. LE DRAN *Obs.* IX, X, and XI. And GARENGEOT on the Cancer of the Lips. Tom. iii. Ch. 6.

2. From a
Tubercle.

Of Chirurgical Operations in the Teeth.

CHAP. LXXVII.

Of Opening the Teeth and Jaws which are clinched.

I. IN some People the Jaws and Teeth are so closely and strongly shut, that they cannot be sufficiently separated either to speak or eat; generally arising from a Spasm or Cramp of the elevating Muscles of the lower Jaw; whence it is also denominated a *Rigor* or *Spasm* of the Jaw. The Cause of this Spasm is not always the same; since it arises sometimes from a Wound or Injury of the Nerves or Tendons in different Parts of the Body, or after the Amputation of an Arm or Leg, as I have frequently observed in Camps: but sometimes again it may proceed from an Inflammation of the Muscles and Parts of the Fauces and Jaw itself.

Causes.

Cure.

II. When the Disorder proceeds from a Wound you should examine whether there are any foreign Bodies concealed therein, so as to excite these and other Spasms: upon removing which Bodies the Spasms cease immediately, though you could procure no Relief before by the best nervous Medicines. If no foreign Body lies concealed in the Wound, you may then reasonably conclude the Spasms to arise from an Injury of the Nerves or Tendons; as is sufficiently apparent from what we have said before of Wounds in the Nerves and Tendons in Part I. Chap. II. N^o II. and III. Therefore you must have Recourse to the Remedies we have there prescribed: and, if they do not succeed, you must totally divide the wounded Nerve, if its Consequence will not be fatal, after which you will presently find these Spasms and Convulsions disappear. Sometimes the injured Nerve is inaccessible, or cannot be divided without imminent Danger to the Patient's Life, which is a deplorable Case; but even here the Patient must either part with the Limb, if possible, or else continue in his convulsive Spasms. Those who are troubled with this Disorder after the Amputation of an Arm or Leg, may indeed be much more easily cured of it; for in this Case the Spasm will generally disappear immediately without other Remedies, upon removing the Ligatures on the Vessels, or the Vitriol, or other Caustic, applied to restrain the Hæmorrhage. Some again cannot be relieved of their Spasms by any Means whatever, so that the Patient is inevitably obliged to perish by them, as I have frequently observed. When an Inflammation of the Tonsils or Muscles of the Jaw excite this Spasm and clinching of the Teeth, you ought to treat the Patient only with Regard to his Inflammation, as in other febrile Disorders: for this being removed as the Cause, the Spasms will quickly disappear as the Effects. But that the Patient may not be starved for want of Aliment during his Disorder, when it holds a considerable Time, he must be plentifully supplied with warm Broth, Egg-cordial made with Ale, Almond Milk, Gellies, and such other fluid Nourishment, as may be easily drawn in betwixt his Teeth tho' shut: and, when you find it necessary, nourishing Clysters may be also administered, composed of the same Substances.

Instruments.

III. We are furnished with several Instruments for opening the Jaws, and separating the Teeth in this Disorder, termed by some *Specula oris*, as in *Tab. XX. Fig. 12.* by which the Mouth may be opened, in order to supply the Patient with Food and Medicines. But, in my Opinion, every prudent Surgeon will reject these Instruments as pernicious; for by the violent Distention of the convulsed Muscles in opening the Mouth by this Instrument, the Pain, Inflammation and Spasms are much more increased; that it will be better to supply the Patient with Suppings and fluid Aliments, which he may draw through his Teeth, as mentioned at N^o II. My Opinion therefore is, that you ought not only to reject this Instrument, but also the Method proposed by M. DIONIS, who advises in this Case to break out a Tooth to supply the Patient with Broths and Medicines, when his Mouth cannot be sufficiently opened by the Instrument. Yet I am far from condemning the Use of this Instrument for inspecting the Mouth, in examining several Disorders of its Parts, or in performing any Operation in the Palate, Tonsils, or Teeth; for in these Cases I much approve of the *Speculum oris*, *Tab. XX. Fig. 13.* or some such other Instrument.

C H A P. LXXVIII.

Of cleansing black and foul Teeth.

I. **A**S the Teeth are frequently infested with a yellow, livid, or black Crust, ^{Cure.} it gives not only great Deformity to the Patient, but also infects his Breath, and loosens or decays the Teeth. We shall therefore here describe the Methods of scouring the Teeth, and discharging their morbid Crust. For this Purpose we are furnished with various Instruments, which may be properly called *Scalpra dentalia*, *Tab. XII. Fig. 14, 15, 16, 17.* some of which are furnished with narrow Points, others with broader, and with Edges; and some again are falciform, as that at *Fig. 17.* But all of them are adapted to one and the same Handle, *Fig. 14. Lit. B.* or, if you please, you may have them fixed, each in a distinct Handle, like that at *Fig. 16 and 17.* taken from FAUCHARD'S *Chirurgien Dentisté.* These Instruments being applied to the Teeth near the Gums, serve to scrape off the foul Crust from their Out-side, while you support them within by the Fingers of your left Hand, taking Care not to wound the Gums, or loosen and displace the Teeth. In this Case it will be also serviceable to rub the Teeth and Gums well with the *Tinct. Gummi Laccae cum Mel. Rosar. & Sp. Salis, aut Vitriol. Gut.* which will not only whiten the Teeth, but also render the Gums more firm. I remember to have seen an Operator for the Teeth, in *Saxony*, who, though he was furnished with various Instruments, did not use any of them in my Presence upon several Patients, but that at *Fig. 17.*

II. But to prevent the black and morbid Crust from spreading over the Teeth ^{Prevention.} again, it will be necessary to supply the Patient with a mild Dentifrice, with which he may frequently rub his Teeth every six or seven Days, and render them white and splendid. But the too frequent rubbing of the Teeth with strong and acrid Dentifrices, does the Teeth as much or more Harm than neglecting them. The common Dentifrices for this Purpose are composed of Powder *ex pumicibus, lateribus, Coralliis, Tabaccaeque cineribus, &c.* But these by their Roughness wear away the Teeth: and the acrid Spirits, as those of Vitriol, and common Salt, dissolve and eat them away by Degrees. Therefore it will be safest to use Dentifrices composed of softer Substances, as the *Ocul. Cancror. Mater perlar. Corn. Cervi. Cret. pp. cum Rad. Florent. or Myrrh. &c.* When the Gums are loose and flaccid, you may add a few Drops of *Sp. Salis* or *Vitriol.* or the following Mixture:

R. *Cretæ præparatæ,*

Myrrh. rubr.

Rad. Irid. Flor.

C. C. præparat. ana ʒj vel ij.

Sp. Sal. G^r ij ad vj. m. f. Pulv. tenuissimus.

Or thus, R. *Conchar. præparatar.*

Matris perlar. præparat. ana ʒij.

Sang. Dracon. ʒj.

Terr. Japon. ʒj. m. f. Pulv. subtilissimus.

Which Powders may be perfumed with a Drop of *Ol. Cinnamon. Caryophil. aut Rhod. Lig.* The Ashes of Tobacco are very efficacious in cleaning black Teeth, if they are not used too often: so is also the following Mixture:

R. *Aq. Plantagin.* ℥j.
Mell. Rosar. ʒij.
Sp. Salis G^r X. m.

In these may be dipt a Bit of Linen to rub the Teeth with every Day till they are whitened, but so as to have some other Dentifrice to be used every sixth or seventh Day in its stead: otherwise you will corrode and destroy the Teeth by too frequent Use of Acids; especially the *Sp. Sal.* and *Vitrioli*, which is the common and pernicious Practice of Quacks. Therefore if you are afraid of injuring the Teeth with these, you may frequently wash them off with cold Water, after the Use of them. And, lastly, one of the best Preservatives for the Teeth is to wash them with cold Water, and rub them with the Fingers, not only every Morning, but also in the Day-time, and in the Evening, adding sometimes a little common Salt, which will both preserve them clean and white, and prevent them from aching and decaying.

C H A P. LXIX.

Of Hollow and Decayed Teeth.

THOSE Teeth which are hollow and decayed are usually carious, and admit some Part of the Food into their Cavities, which by Degrees putrify, become acrimonious, and only further destroy the Teeth themselves, but also irritate the internal Periosteum, and small Nerves of this Bone, so as to excite intolerable Pain: to prevent which various Methods have been contrived. The first is to cleanse the Cavity of the Tooth with a Needle, Tooth-pick, or some other convenient Instrument, *Tab. XX. Fig. 19, 20, 21.* and then to fill up the Space with white Wax or Mastich, as often as you shall see Occasion: by which Means the Teeth will be preserved from Foulness and farther Decay. When the Caries is but superficial, it may be frequently removed by the Rasp. But when the Disorder is in the larger grinding Teeth, especially in the Middle, it will be best to fill them as exactly as possible with a bit of Lead or Gold, by means of the Instruments, *Tab. XX. Fig. 20, 21.* But when the Caries has reached the Root of the Tooth, so as to excite intense Pain, the Patient may be relieved by filling the Tooth with *Ol. Caryoph. Cinnam. vel. Lign. Guaiac. &c.* and if these do not prove strong enough, it may be convenient to cauterize the Tooth with a red-hot Instrument for this Purpose inserted into its Cavity, *Tab. III. Fig. 14, 16.* or *Tab. XX. Fig. 20, 21.* by which Practice you will free the Patient instantly of his Pain, without giving him any great additional Torture, provided you do not burn any of the adjacent Parts of the Mouth. That the Teeth which are thus cauterized, may be guarded from a Return of the Pain, they should have their Cavities filled with Lead or Gold as before: and

if

if this last Method proves ineffectual, or if the Cavity cannot be filled with Wax, Lead, or Gold, there then remains but one Remedy, which is to extract the Tooth, as we shall presently teach.

C H A P. LXXX.

Of the Chirurgical Methods for easing the Tooth-Ach.

SOMETIMES the Tooth-ach is so obstinate and intense, as to yield to no Remedy: and therefore the Patient must have Recourse to the Surgeon's Assistance, who may relieve him sometimes, 1. By scarifying the Gums, as PLINY has long ago observed, and which has been confirmed by frequent Experience; or, 2. By inserting an actual Cautery, or hot Iron into the Cavity of the Tooth, in the Manner directed in the preceding Chapter; or, 3. You must scarify or cauterize behind the Ear, under that Part which Anatomists call *Antitragus*. See Chap. LXVIII. Or, according to SCHELHAMMER, you must strongly press the Part with the Fingers; or, lastly, 4. The decayed and aching Tooth is to be drawn.

C H A P. LXXXI.

Of rectifying Irregularities of the Teeth, which lacerate the Tongue and Cheeks.

SOMETIMES the Teeth stand more out or in than they ought; and sometimes the sharp Points of a broken Tooth stand out unequally. These Accidents not only impede the Mastication of the Food, and Formation of the Voice, but frequently lacerate the Tongue, Lips, or Cheeks, from whence very often proceed Inflammations, Tumours, Ulcers, and sometimes a Cancer. To remedy which Disorders it will be necessary to file away the Inequality by the Instrument represented *Tab. XX. Fig. 22.* or, when that is impracticable, to draw the Tooth.

C H A P. LXXXII.

Of drawing Teeth.

I. **T**OOOTH-DRAWING, according to CICERO, (*De Natura Deorum, Lib. iii. Cap. 22.*) was first invented by ESCULAPIUS; in whose Temple the Ancients hung up a Pair of leaden Pincers, to signify, as I think, that it would be dangerous and improper to extract any Teeth, but such as might be removed with leaden Forceps; that is, such as are loose, and almost ready to fall out: for they do not consult their own Welfare, who imprudently remove their Teeth without absolute Necessity, whilst they are sound and entire. For
Evulsion

Evulsion of the Teeth is not only a dangerous and painful Operation, but has even sometimes hazarded the Patient's Life: at least they deform the Speech, and impair the Act of Mastication by this Means, more especially in Adults, in which we can have no Hopes of others growing up in their room: However, it is sometimes absolutely necessary to draw Teeth.

II. 1. In Infants for removing those deciduous or lacteal Teeth, which, being loosened by the Fingers, may be extracted with a Thread, or a Pair of Crow's Bill Forceps; for when these Teeth are left too long in the Sockets, they may displace and turn the new ones awry. 2. It will be proper to extract those Teeth in Infants which grow out of the Palate, or some other improper Part of the Mouth, which both hinder their Speech and Sucking. 3. Extraction is often the only Method of relieving the Tooth-ach, which is very intense, proceeding from a Caries in the Teeth, and incapable of being eased by any Medicines. 4. Those Teeth ought to be drawn, which, by their irregular Figure and Position, wound and lacerate the Tongue, Lips, and Cheeks. 5. It is often absolutely necessary to draw a Tooth for curing a Fistula, or Ulceration of the Gums next the Teeth.

III. The Method of drawing them is as follows. If the Tooth to be drawn is fixed in the lower Jaw, the Patient must be seated on a low Seat, or on the Floor. But when in the upper Jaw, he must be seated on a high Stool: after which the Surgeon takes his Instrument best adapted to the Case, and thereby draws out the Tooth, as if extracting a Nail out of a piece of Wood, drawing the upper Teeth downward, and the lower Teeth upward: yet there is a particular Slight to be used, to avoid breaking the Teeth, as you may see described more at large in M. FAUCHARD's Book, intituled, *Le Chirurgien Dentiste*.

IV. The Instruments used for Tooth-drawing are so many and various, that almost every Operator is furnished with a particular one of his own. But those most in Use are the *Pelicanus*, *Forfex*, and *Crow's Bill*; and less common, but more commodious, are the Instruments represented in *Tab. XX. Fig. 23, 24, and 25.* though the Uses of them can be much sooner shewed to the Eye, than described by Words^a. There are also various Instruments for drawing Stumps of Teeth, which cannot be extracted with the *Forfex*, particularly the *Goat's Foot*, and that at *Fig. 26.* That End of *Fig. 23.* marked A, also serves for this Purpose.

V. We shall conclude this Chapter with observing, that though it is often absolutely necessary to remove or extract the Teeth, yet you ought not to perform the Operation while the Patient's Gums, and Parts adjacent, remain inflamed and tumified. For there is great Danger in these Cases of throwing the Patient into violent Tortures, and indeed of worse Symptoms ensuing, and sometimes very dangerous Hæmorrhages. But, above all, we should particularly dissuade Women with Child from this Operation.

^a More Instruments may be seen in FAUCHARD's *Chirurgien Dentiste*, Paris, 8vo 1718. and in M. GARENGEOT's *Traité des Instrum. Chirurg.* 8vo Paris 2d Edit. 1727.



C H A P. LXXXIII.

Of Artificial Teeth.

TH E great Deformity of the Face, and the Impediment of the Speech, occasioned by the Loss of one or more of the Teeth in the anterior Part of the Mouth, has occasioned the Art of framing other Teeth to supply their Places, made of Ivory, Bone, or the Tooth of a Sea-horse. When several Teeth are out in the same Place, it is best to make a Sett, or the Number wanted, out of one Piece, all adhering together, which may be fastened to the two next of the sound or natural Teeth. But to preserve these artificial Teeth clean and sound, it is adviseable to take them out at going to Bed, to wipe them clean, and to insert them again in the Morning. But if any Stump or Splinter should resist and obstruct the replacing of the artificial Teeth, it must either be extracted, or taken down by the File. See more upon *artificial Teeth* in FAUCHARD.

EXPLANATION of the TWENTIETH PLATE.

Fig. 1. Represents the Hare-Lip of an Infant two Years old, whose Palate was also fissured, and you may see the two *Dentes Incisores* on the left Side.

Fig. 2. Denotes a triangular pointed Needle for joining the Hare-Lip.

Fig. 3, and 4. Are two other Needles for the same Purpose, the former with a flat Point, and made of Brals or Silver, and the latter of the same Make and Metal, but without a Head.

Fig. 5. Represents two of these Needles passed through the Hair-Lip, with a Ligature circumvoluted or tied round them orbicularly.

Fig. 6 and 7. Represent a Couple of *Tenacula* used by some in the Hare-Lip, to secure and retain the Margins which they scarify, and prevent their profuse Bleeding. The Parts A B are those which hold the Lip fast, by thrusting up the Rings C C towards B B.

Fig. 8. Is a Needle in Form of a Larding one, contrived by M. PETIT of Paris, to perforate the Hair-Lip, and introduce the Pins *Fig. 9.* inserted in its Fissure.

Fig. 10. Is a Needle which I prefer before the former, it having but one Head.

Fig. 11. Is a Face with an ulcerated Cancer in the lower Lip *a a a*; *b b b* Part of the cancerous Tumour extending itself to the left Angle of the Lips.

Fig. 12. Represents the *Speculum Oris* furnished with a Screw to open the Teeth and Jaws when they are clinched fast together in Convulsions, &c. A A the Parts which are interposed betwixt the *Dentes incisores*, and which are divaricated or opened by the Screw B.

Fig. 13. Is another *Speculum Oris* made almost like a Pair of Forceps; A the Part which depresses the Tongue, while the Parts B B elevate the *Dentes incisores* of the upper Jaw under which they are placed; C C the Handles.

Fig.

- Fig. 14, 15, 16, and 17. Represent several Instruments to scrape and cleanse the Teeth from tartarous and discoloured Crust, each of which are adapted by the Screws C C C to the Handle B at Fig. 14.
- Fig. 18, and 19. Are two Instruments for the same Uses, but larger, and judged to be the most commodious by FAUCHARD.
- Fig. 20, and 21. Are two Instruments for cleansing and cauterising hollow Teeth, and for filling their Cavities with Lead or Gold.
- Fig. 22. Is a Rasp or File to take down rough or angular Parts of the Teeth: A the File, B the Handle.
- Fig. 23. Is an *Odontagra*, or Instrument to draw Teeth. The Part A serves to extract Stumps instead of the *Goats-foot*; and the Part B with the Hook C serves to extract whole Teeth. For the Hook C may be not only elongated to the Size of the Tooth by the Screw D: but it may be also turned back, and repositied in the Case E, so as to be conveniently carried in the Pocket.
- Fig. 24. Is another convenient *Odontagra*, which may be easily adapted either to large or small Teeth, by screwing round the Nut B.
- Fig. 25. Is another for drawing the Teeth, furnished with three Hooks, one straight A, and two crooked B C; the straight serving to draw out the anterior, and the crooked the posterior Grinders on each Side the Jaw, fastened to the Instrument by the Screw D: also the *Fulcrum* of the Instrument F may be set longer or shorter from the Handle by the Screw G.
- Fig. 26. Is an Instrument for extracting some Teeth, and particularly Stumps.

Of Chirurgical Operations in the Gums.

C H A P. LXXXIV.

Of Lancing the Gums in Dentition.

TH E Difficulty which some Infants meet with in cutting their Teeth, very often excites not only intense Pain and Inflammation in the Gums, but also Convulsions and epileptic Fits, which frequently kill the Infant. The Gums in these Cases are usually too thick and tough to be pervaded without great Difficulty by the young Teeth shooting up: which as they gradually advance, violently distend the Gums, and excite the forementioned Symptoms. Upon the Appearance of these, when you are called to an Infant, you should inspect the Gums, and make a transverse Incision upon the Tooth, where it shews itself to be rising by a Redness and Tumour of the Gums; after which those malignant Symptoms will generally disappear^a, and the Wound may be treated with *Syrup Viol.* or *Mel. Rosar.* Dr. SYDENHAM asserts, that the difficult Dentition of Infants, though unattended with any Inflammatory Disorder, can by no Means

^a As hath been observed by PAREY *Lil.* XXIII. Chap. 67. SYDENHAM in *Opusc.* and DRAKE *Anat.* Book IV. Chap. III.

be better relieved than by Phlebotomy. And, in Adults, VESALIUS^a observes, that the Pain and Inflammation which often arises at cutting the *Dentes sapientiae*, at near twenty Years of Age, is presently relieved by incising or scarifying the Gums affected, as I was obliged to do for myself when about twenty-six Years old. We have also an Observation in AMB. PAREY's Surgery (*Book 24. Chap. ult.*) of a Son eight Months old of the Duke of Navarre, who was lost for want of having his Gums lanced in difficult Dentition.

C H A P. LXXXV.

Of Epulides or Excrescences of the Gums.

THE fleshy Tubercles or Excrescences of the Gums termed *Epulides*, are of two Kinds; some being of a mild Nature, and without Pain, others malignant and inclining to be cancerous. They are again distinguishable from their Size and Appearance, into large and small, hard and soft, and supported either by a broad or slender Root. These Excrescences not only deform the Mouth, but are also an Impediment to the Speech, and to Mastication, and do therefore require a speedy Extirpation, which is the best Method of relieving the Patient. When this Kind of Excrescence in the Gums is sustained by a small Root, the best Method of Extirpation, is by a Ligature, about the Root, with a Thread^b. But when the Root is broad, it will be more convenient to extirpate the Excrescence by mild Escharotics or Caustics, particularly *Ol. Tartar. p. d. vel. Sp. Salis Ammoniaci*. And when the milder Sort of this Tribe prove ineffectual, it will be safest to extend them with a Hook, or the Pliers, while you extirpate them with the Scalpel, yet so as to avoid separating the Gum itself from the maxillary Bone, which might produce a *Caries*. The Blood may be permitted to flow for some Time: but if it proves too profuse and lasting, an astringent Gargarism must be used, of red Wine or Oxycrate, with Alum, with which the Patient must frequently wash his Mouth, till the Hæmorrhage ceases. When the Blood is stopped, the Parts affected may be treated every Day with *Tinctura Myrrhæ cum Melle Rosarum*, the Use of which should be continued till they are healed. If any Part of the Tubercle should remain behind, or sprout up again, it should be taken down in Time by the before-mentioned mild Escharotics, or with a bit of *Vitriolum Cæruleum*, or else removed with the Scissars or Scalpel. The actual Cautery is here recommended by some, who give us Instances of Cures this Way performed; but the Application of them is not only very inconvenient in the Mouth, but also extremely painful. A remarkable Instance of this Disorder removed by the Scalpel is given by MEEKREN, in *Obs. XXVIII*. And SCULTETUS, in *Obs. XXXV*. says, he happily extirpated an Excrescence of this Kind, which adhered to the Gums close to the Palate behind the anterior Teeth, by applying the Pair of

^a *De Humani Corporis Fabrica*, Lib. I. Cap. XI.

^b An Instance of this Method of Cure you have in SCULTETUS.

Pliers made for removing *Polypuses*. And a few Years ago I observed one in the Palate behind the *Dentes incisores*, of a certain Monk, which being accompanied with a *Spina ventosa* in the Bones of the Palate, and the Patient not willing to admit the Use of the Cautery, it at last killed him.

C H A P. LXXXVI.

Of Parulides, or Boils and Abscesses of the Gums.

SOMETIMES a Tumour and Inflammation of the Gums, in various Degrees, arises from intense Pains of the Teeth and Jaws: which inflammatory and painful Tumours are by the *Greeks* termed *Parulides*, and popularly they are denominated Gum-boils. The Treatment of them must be conducted like that of other inflammatory Tumours, *viz.* by Discutients. But if they fail, or if the Disorder be neglected, it usually terminates in an Abscess or *Fistula*. Therefore if the Tumour be recent, you had best abate the Pain, which hinders the Patients from Sleep, by bleeding first, and then by the Application of the following Discutients, *viz.* *Chamæmeli Salvia*, *Flores Sambuci*, &c. boiled in Water or Milk, which should be often taken warm into the Mouth by the Patient, and held therein for some Time. Externally may be applied Bags filled with the same Herbs, or else a Plaster of Melilot or Diachylon with Camphire, secured with a warm Handkerchief to keep out the Cold, not neglecting discutient and diaphoretic Medicines internally. If the Disorder cannot be thus dispersed, you will have Occasion for the Use of emollient Applications, such as Mallows, Marsh-Mallows, Mullen, Figs, &c. boiled in Milk, and frequently retained in the Mouth. To forward the Maturation externally, you may apply half a roasted Fig to the Tumour with an emollient Cataplasim secured upon the Outside of the Cheek. When the Softness of the Tumour denotes its having come to Suppuration, you ought immediately to open it by Incision, to discharge the Matter, lest it should erode the adjacent Bone, or produce a stubborn *Fistula*. The contained Matter may be discharged after your Incision, partly by pressing with the Fingers, and then with warm Wine, or a Decoction of vulnerary Herbs mixt with *Mel. Rosar.* which should be also used as a Gargle, till the Parts are well cleansed and healed. When the Ulcer penetrates deep, it will be necessary to inject this Decoction by a Syringe; and after discharging the Liquor again, a Compress is to be secured upon the Bottom of the Ulcer with a Bandage, to make that Part unite first. But when the Ulcer degenerates into a *Fistula*, accompanied with a *Caries* in the Bone, you ought then, after each Injection, to apply a little *Tinct. Myrr. vel Elix. Proprietat.* to deterge the Parts, and dispose them for healing. By which Method I have frequently cured not only simple Ulcers of the Gums, but also those which have been accompanied with a *Callus* or *Caries*, and of above a Year's standing. But if all these Medicines prove ineffectual, the *Fistula* must be laid open by Incision, and the *Caries* removed either by Medicines, the Rasp, or the actual Cautery, as we have directed before in Part I. Book V. Chap. VIII. Sometimes a carious Tooth occasions the *Fistula* of the Gums, which therefore ought to be first extracted, before the Application

Application of the proper Medicines. There are several Observations upon these Disorders in the *Miscellanea Berolinensia*: from whence it appears, that suppurating Medicines are of little or no Service; and that if these Tumours are not quickly laid open by Incision, and the Tooth extracted, they degenerate into obstinate *Fistulæ*. It is therefore much the best to be rather too early than late with your Incision, in order to discharge the Matter, though crude, rather than let it spread the Disorder, so as to affect the Bone, under a Notion of bringing it to Suppuration. For more on this Subject, the Reader may consult an accurate Dissertation *De Epulide & Parulide*, published by SCHELHAMMER, An. 1692.

Of Chirurgical Operations in the Tongue.

C H A P. LXXXVII.

Of depressing the Tongue.

TH E R E are many inflammatory Disorders of the Mouth, Palate, Tonsils, *Uvula*, and *Fauces*; also Tumours, Abscesses, &c. in those Parts; which require a Depression of the Tongue to inspect and treat with proper Remedies. To perform this, the Instrument termed *Glossospatha*, or *Speculum Linguae*, *Tab. I. Lit. P*, has been generally used. But the nicer Patients, who are averse to an Instrument of this Kind that has been applied to others, make Use of the flat Handle of a Silver Spoon, with more Neatness and Convenience: but the Application of either of these Instruments should be made very gently, to avoid giving the Patient Pain, and that you may not irritate the inflamed Parts. So when there is Occasion for any Injections, the Syringe is to be conveyed into the Mouth, over the Handle of the *Spatha* or Spoon: or if there be any Ulcer of the Mouth, a *Polypus* in the Nose, or any Disorder in the Tonsils, in which the Mouth cannot be sufficiently opened, you may then make use of the *Speculum Oris*, *Tab. XX. Fig. 12 or 13*.

C H A P. LXXXVIII.

Of dividing the Frænulum of the Tongue.

I. **T**H E Tongue is sometimes tied down too close to the Bottom of the Mouth by a Ligament connected all along to its Middle, usually termed its *Frænulum*, which requires to be incised or divided, to give this Organ its proper and free Motion. This Disorder generally arises in Infants soon after their Birth; so that they cannot move and properly exert their Tongues in the Action where the Operation is necessary.

of Sucking; though it is sometimes also observed in Adults; and in both requires the Care of the Surgeon. However, it may be observed, that this Operation is not necessary in all new-born Infants promiscuously, as many Nurses and Midwives imagine; for it is hardly necessary in one among a Thousand of them, and is a Disorder not so often met with as the Hare-Lip, as hath been frequently observed by myself and many other prudent Physicians. When the Infant can put the Tongue out of his Mouth, the *Frænulum* does not require any Incision; for that Organ may be then capable both of sucking and speaking, when there is no other Impediment. But when the Tongue cannot be extended out of the Mouth beyond the Teeth, it may be then indeed necessary to divide the *Frænulum*, or other Membrane, by which it is too closely connected. But as this Operation is sometimes attended with bad Accidents, and even the Death of the Infant, when rashly performed, we shall make it our Business, in this Place, to describe the proper Method in which the same ought to be executed.

Method of
Incising.

II. First, the Infant is to be laid in the Lap of a strong Person, and his Head held fast by another Assistant: then the End of the Tongue is to be covered with a Linen Cloth, and held betwixt the Fingers to prevent it from slipping, as in *Tab. XXI. Fig. 1.* or else the Tongue may be elevated by a Kind of Fork for the Purpose, *Tab. XXI. Fig. 2 and 3.* or *Tab. I. Lit. O or P*: after which the Ligament of the Tongue running betwixt the ranular Veins and inferior salival Ducts, it is to be divided with a Pair of obtuse pointed Scissars, *Tab. I. Lit. C*, or with a Scalpel, till you think it free enough for sucking and speaking. But, in dividing the Ligament, you must be careful to avoid wounding any of the salival Ducts, or the proper Veins and Nerves of the Tongue. For DIONIS, in his Surgery, mentions an Infant who expired, soon after the Operation, by a profuse Hæmorrhage from the ranular Veins: and therefore, if you should wound one of these, a Compress must be applied under the Tongue, which has been first dipt in Vinegar. If the Tongue is not sufficiently freed by this Operation at the first Time, you may make a farther Division of the Ligament a few Days after, treating the Wound afterwards with *Mel. Rosar.* or *Syrup. Viol.* frequently applied by a Feather, to prevent the lately incised Parts from adhering again to each other.

Scholium.

III. From what has been said, it appears that this Operation is seldom necessary, and sometimes of dangerous Consequence. Hence those Midwives justly deserve to be censured, who always thrust their Fingers into the Infants Mouth, in order to lacerate this Ligament soon after the Birth: for the Inflammation, and other bad Consequences induced by this rash Practice, may not only throw the Child into Convulsions, but may even prove the Cause of its Death. When therefore such a Division of the *Frænulum* is necessary, as it is not very often, it ought to be cautiously incised with a Scalpel or Pair of Scissars, and not roughly lacerated with the Finger-Nails; the bad Consequences of which may be seen related more at large in HILPANUS, *Cent. 3. Obs. 28.*

C H A P. LXXXIX.

Of a Ranula or Tumour, and Calculi under the Tongue.

TH E Term *Ranula* is generally used to signify a Tumour or Abscess Description, under the Fore-part of the Tongue on either Side, near the Veins of that Name. The Matter contained in these Tumours is various, being sometimes a tenacious and mucous Lymph, sometimes a thicker and purulent Matter, and sometimes of a hard and stony Consistence. The Tumour itself often grows very fast, and not only impedes the Speech and Deglutition of the Patient, but also frequently excites most acute Pains. Sometimes indeed we meet with a Sort of fleshy Tubercles in this Part, which are more dangerous as they are painful, because they sometimes degenerate into a Cancer, as I have more than once observed. Infants are generally more infested with Tumours in this Part than Adults: nor can they be easily removed, through the Difficulty of applying and retaining Medicines to them. It is also still more difficult to bring a *Ranula* to Suppuration for the same Reasons; so that the only Relief to be had, must be expected from the Hand of the Surgeon.

II. As these Tumours are much of the same Nature with those of the encysted Kind, it will be best to extirpate them in the same Manner, as we have before directed in Chap. XXVIII. but then you will not find it so easy to remove these; partly from the Difficulty of retaining Medicines, and partly from the frequent Cryings of the Infant; which last may render the Operator very liable to wound the Nerves, Blood-Vessels, and salival Ducts of the Tongue, whence generally arise intense Pains, Inflammation, profuse Hæmorrhage, and perhaps Convulsions, or the Death of the Infant. It will therefore be much safer to turn the Tongue upwards, and make a transverse Incision upon the Tumour, so as to discharge its included Matter; after which you may deterge or destroy the remaining Tunic with *Mel. Rosar.* sharpened with *Sp. Vitriol.* and then the Cure may be easily completed with *Tinct. Myrr.* and simple *Mel. Rosar.* or a Mixture of Oil and Sugar. Sometimes the Tubercle breaks of itself, without the Use of any Instrument or Medicine: and then you must deterge and heal the Ulcer as before. Sometimes the small Glands under the Tongue appear much enlarged with Pain and Inflammation: in this Case the Patient ought frequently to retain warm Milk, or half a roasted Fig in his Mouth upon the Parts affected, with an emollient Cataplasim and Plaster applied under his Chin, that the Tumour may be either dispersed or suppurated: when it is ripened by this Method, it must be incised, deterged, and healed, as we before directed for Abscesses in the Gums, Chap. LXXXV. I have sometimes observed a Tumour of this Kind under the middle of the Tongue, where the salival Ducts open into the Mouth; and in this you ought not to make any Incision, to avoid injuring those Ducts, or the adjacent Nerves or Blood-Vessels: but you ought rather patiently to wait till the Tumour breaks of itself, and then you may deterge and heal as before. In cancerous Tumours of this Kind, the Patient will hardly receive any Benefit from any Operation or topical Remedies whatever. If

a small Stone is found in this Part of the Tongue, after making an Incision, if it does not fall out of itself, you must extract it with a Probe or Pair of Pliers, detarging and healing the Wound as before. See ROONHUYNS *Obs. Chirurg.* 29.

C H A P. XC.

Of a Scirrhus and Cancer in the Tongue.

Diagnosis.

I. **W**HEN Part of the Tongue appears tumified and hardened, without Pain, the Disorder is said to be a *Scirrhus*; which, by becoming painful, and discharging a purulent fetid Matter, gradually degenerates into a Cancer, as we before observed in treating of a *Scirrhus*. The Tumour, in itself, often appears at first no larger than a Pea, or small Hazel-Nut; but sometimes it grows much larger, and occupies the greatest Part of the Tongue, being either moveable or immoveable. The Cancer of the Tongue is sometimes latent and entire, and sometimes open or ulcerated, discharging a putrid and fetid Matter, which gradually destroys the Tongue. Sometimes this dangerous Disorder arises without any manifest Cause; but more frequently it proceeds from some sharp or rough Parts of a Tooth, which prick and wound the Tongue: from which Cause I have sometimes seen it eroded laterally, and sometimes from its Tip backwards.

Cure.

II. In the Treatment of this Disorder, you therefore ought first to remove the Roughness or Inequality of the Teeth, which injured the Tongue, by the Rasp, *Tab. XX. Fig. 22.* or some other proper Instrument, without which the Disorder will be continually irritated, instead of yielding to the Action of Medicines. After having rasped or extracted the Tooth, the Tongue must next be treated with *Tinct. Myrrh.* or *Mell. Rosar.* with *Balsam. Peruvian. vel de Meccha.* When the Disorder arises from internal Causes, you must treat the Patient with the proper internal Medicines usual for a *Scirrhus* or Cancer; though generally they take little or no Effect. Where they take no Effect, after applying them for some Time, the Assistance of the Steel must be immediately called in; for Delays are of very bad Consequence, enhance the Complaint, and render the Operation extremely dangerous. There are indeed some Tubercles of the Tongue about the Size of a Pea, or a little larger, as I have sometimes observed, which do not always keep of the same Size: but being without Pain, they are tolerable for many Years, or even till the Patient dies, without giving any great Uneasiness^a. These are best left to themselves, like many mild *Scirrhi* and Cancers; for the more you irritate them with Medicines, the worse they generally grow, so as frequently to degenerate into an ulcerated Cancer, and destroy the Patient. But when a *Scirrhus* of the Tongue grows very large, and very painful, it ought to be extirpated as soon as possible. If the Tumor is moveable, an Incision must be made in the Tongue

^a I knew an Instance of such a Tubercle in the Tongue of a learned Man, which has continued in the same State for near these thirty Yeats: I persuaded him not to irritate it with Medicines, but to leave it to Nature.

with the Scalpel, till you can readily separate the morbid from the sound Parts; but when immoveable, and not very large, Part of the Tongue ought to be taken off with it. Yet when it is very large, or spreads through the whole Root of the Tongue, it is better to relinquish the Operation, by which the Cancer cannot be totally extirpated, rather than torment the Patient to no Purpose, or hasten his Death: for if a Cancer be not cleanly extirpated, it usually rages worse than before. To perform the Operation, an Assistant must be first placed behind the Patient, to hold his Head, with two other Assistants on each Side, to extend and hold fast the Tongue, either with their Finger and a Cloth, or Pliers like those in *Tab. XIX. Fig. 9* or *10*. After you have extirpated the *Scirrhus*, or Cancer, the Wound may be healed with *Mel. Rosar. & Bals. Peruv. vel de Meccha*, detarging with *Tinct. Myrrhæ*, and healing with *Ol. Amygd. dulc. rec. cum Saccharo*, in the Form of a *Linctus*. When the Cure is completed, the Patient must be confined to a proper Regimen and Diet all his Life, with the Use of proper Remedies at stated Seasons, to prevent a Relapse, as we before directed for Cancers. We have a remarkable Instance of this Disorder cured by the expert Anatomist *RUYSCH*, in *Obs. 76*. in which, having extirpated the ulcerated Cancer in the Tongue by the Scalpel, he applied the actual Caustery, and afterwards completed the Cure, which could not be effected without Cauterization, though it had been several Times extirpated before. On the other Hand *MARESCHOTT*, a Physician of *Modena*, gives you as remarkable an Instance, where a large cancerous Tumour was effectually cut off from the left Side of the Tongue. See his Treatise on this Operation, published at *Modena*, 1730.

CHAP. XCI.

Of Ulcers in the Palate.

I. **W**E sometimes meet with Ulcers in the Palate, which not only destroy the adjacent fleshy Parts, but also erode and extend themselves into the Bones of the Nose. The Patient afflicted with these has not only his Speech vitiated by them, but also any Liquor, upon drinking, regurgitates into the Nose with great Uneasiness. Such Ulcers proceed mostly from a scorbutic Acrimony, or a venereal Infection in the Blood: and if those Disorders are not speedily removed, as their immediate Cause, the Ulcers will frequently destroy not only the whole Palate, but also the several Parts of the Nose itself, to the great Misery and Deformity of the Patient.

Their Symptoms and Causes.

II. In the Cure of these Ulcers you must have a principal Regard to the morbid State of the Blood, and first correct its venereal or scorbutic Acrimony, with proper internal Medicines. If the Palate is not yet perforated by the Ulcer, it will be proper, first, to cleanse the Parts by frequently injecting a deterging Gargle made of vulnerary Herbs, and mixed either with *Mel. Rosar. Ung. Ægypt. vel. Fusc. Wurtzii*, as you would have it more or less detarging. The Honey that swims on the Top of *Ægyptiacum* and the *Aqua aluminosa Fallopii*, are good Detergents in these Ulcers, which are accompanied with *Caries*. After these

Cures.

these Detergents have been used some Time, so that the Ulcer appears clean, you may then dress with *Mel. Rosar. Tinct. Myrrhæ, Elix. Propriet. vel. Balf. Peruv.* applied with Lint.

When with
Caries.

III. When the Bones of the Palate are also carious, the foul Parts will very often separate from the sound by the Use of the aforesaid Medicines; especially if you sometimes dress with *Mel. Rosar.* acidulated with *Sp. Vitrioli*. But when these prove insufficient, you must gently apply an actual Cautery to the foul Bone, after you have first cleansed and dried it with Lint, and secured the Tongue, by depressing it with the *Specillum Oris* or a *Spatula*. After your Cauterization, the Parts must be dressed with Balsams, till the naked Bone is again covered with Flesh. But sometimes these Perforations of the Palate into the Nose are never closed up again, but remain open.

C H A P. XCII.

Of stopping Perforations of the Palate into the Nose.

WHEN the Palate is perforated into the Nose, so as to vitiate the Speech, and occasion Liquors to regurgitate in this Organ upon drinking, your Remedy in this Case is to close or stop the Perforation as exactly as possible by Art, with a proper Instrument; since you cannot procure the Bone and Flesh to grow so as to fill up the Space. The Patient must therefore have a Plate of Silver or Gold adapted to the Perforation, and furnished with a Handle or small Tube, which being armed at the Top with a Sponge, as in *Tab. XXI. Fig. 4, 5.* he may thereby exactly close the Perforation. The Sponge being inserted into the Perforation, prevents the Plate from falling down from the Palate, and by that Means renders the Patient able to speak and swallow, as if his Palate was entire. But he should be provided with two of these Instruments, that after one has been wore a Day, it may be extracted, washed, and dried against the next Day, to prevent the imbibed Humour from putrifying and smelling. I once saw such a Perforation of the Palate, occasioned by a Bullet, in an Officer, which was remedied in this Method. *PARÆUS* describes another Kind of Plate, which he uses without the Assistance of the Sponge. See *B. XXII. Chap. 4.*

Of Chirurgical Operations on the Uvula and Tonfils.

C H A P. XCIII.

Of a Tumour and Prolapsus of the Uvula.

Cure by
Medicines.

I. **T**HE Uvula is sometimes so much enlarged and elongated, as even to reach the *Larynx* and *Pharynx*, and obstruct the Actions both of Respiration and Deglutition, as well as Speech. If it proceeds from a recent Inflammation

Inflammation, as you may judge from the Pain, Heat, and Redness of the circumjacent Parts, the Patient may be relieved with cooling Gargles and Injections of Wine and Water, or a Decoction of proper Herbs with a little Alum, or *Sal Ammoniacum*: but at the same Time proper Coolers must be used internally, with Bleeding, Purges, and Clysters, to prevent the Inflammation from spreading through the *Fauces*, and exciting a Quinsy. Scarifications are very useful here, both to remove the Inflammation and prevent its spreading, as I have long ago experienced both upon myself and others. When this Part is too much relaxed and elongated by phlegmatic Humours, it usually appears white, and free from Pain or Inflammation: and therefore in this Case you will find most Benefit from a Gargle of warm *Sp. Vini* and Water, or an astringent Decoction *ex Flor. Rosar. rub. & Ligustri, Cort. Granator. &c.* mixed with *Sp. Vini vel Sp. Salis Ammoniaci*. If the Disorder still continues, another Method must be taken to remove the phlegmatic Humours by an Aspersio or Powder *ex Zinzib. vel Piper. cum Cort. Granator.* which may be also mixed with Honey, and applied with a Tea-spoon, or the Instrument in *Tab. I. Fig. 4.* not neglecting proper diaphoretic and cathartic Medicines internally at the same Time.

II. When the Disorder still continues, notwithstanding the Use of these Remedies, so as to obstruct the Patient's Respiration, Deglutition, and Speech, it will then be necessary to remove so much of the *Uvula* as shall appear to be superfluous, which may be taken off several Ways. The first is by Ligature, made upon the *Uvula* with an Instrument for the Purpose, as we have represented in *Tab. XXI. Fig. 6.* from HILDANUS and SCULTETUS. First, a strong Thread A is conveyed through the Hollow of the Instrument by the long Needle, *Fig. 7.* so as to make a Noose with it in the Ring B, through which Noose is transmitted so much of the *Uvula*, as shall be thought superfluous, and by drawing the Thread C, the Noose is firmly contracted; then removing the Instrument, the Ligature is left upon the *Uvula*, and by Degrees tightened on the following Days, till the inferior and redundant Part of the *Uvula* drops off. But it must be confessed, that this ingenious Method is very tedious and troublesome both to the Patient and Surgeon. There is a much more ready Method than this, by depressing the Tongue with the *Spathula, Tab. I. P or R,* and then clipping off the redundant Part of the *Uvula* with a Pair of Scissars; in performing which the main Point is to extirpate neither more nor less than necessary. For if you remove too little, the Patient's Respiration will be still impeded, and he will be little the better for the Operation: and if you remove too much of the *Uvula*, the Patient's Voice will be vitiated afterwards. But if the Surgeon's Hand is not strong enough to depress the Tongue with the *Spathula*, and extirpate Part of the *Uvula* at the same Time, it will be most convenient for him to operate with the Instrument contrived by a Countryman of Norway, where this Disorder is very frequent: which Instrument is also very well described by BARTHOLIN and SCULTETUS. It consists of a little Knife fastened to a broad Plate of Steel, which is perforated in the fore-part, and by letting loose a Spring on the Side of the Plate, the Knife flies out with great Celerity, and cuts off the redundant Part of the *Uvula*. This Instrument has, I think, been reformed by RAW as in *Tab. XXI. Fig. 8.* so as to be without any Spring. The Knife C being strongly thrust forwards through

Cure by Abs-
cision.

the Stick B B, at once cuts off so much of the *Uvula* as you let through the *Foramen A*, the Instrument itself being held in the Mouth with the left Hand by the Handles D D D, so as to depress the Tongue sufficiently at the same Time, without the Use of a *Speculum Oris*.

How to re-
strain the
Hæmor-
rhage.

III. Having thus extirpated the redundant Part of the *Uvula*, the Blood may be permitted to flow a while, and then you may restrain it by a Gargle of warm Wine, Vinegar, or *Oxyerate*: and, if it still continues, you may apply a little Alum by the Spoon, *Tab. I. lit. N.* or you may, after the Manner of the Ancients, touch it with a hot Iron, but not red till the Hæmorrhage ceases. But when the *Uvula* is also infested from some venereal Cause at the same Time, the Surgeon must in the Interim treat the Patient with proper internal Medicines before he can expect or obtain a Cure.

C H A P. XCIV.

Of Scarifying the Tonsils when inflamed in a Quinsy.

A Violent Inflammation of the Tonsils, especially in a Quinsy, may be justly ranked among the most dangerous Disorders: because we are assured from Experience, that it may be followed with a Gangrene and fatal Consequence. To prevent which, we must call in the Assistance of the most potent antiphlogistic Remedies, such as bleeding in the Arm, Foot, Neck, and under the Tongue, with Scarification of the Tonsils themselves, besides the Remedies before proposed for an Inflammation of the *Uvula*. It was a Practice with the ancient Surgeons to scarify, and cup upon the external Parts of the Neck nearest to the Tonsils; the Usefulness of which I have often experienced. And I am also informed, by an expert Physician, that in *England* they often, after *Celsus's* Example, scarify the Tonsils internally: by which Means, with the Use of proper internal Medicines, drinking Plenty of thin Liquors, and with cooling Clysters often repeated, the Patient usually recovers. Therefore it is nothing extraordinary to meet with the same Practice among the *French* Physicians, as we are told by *GARENGEOT* in the first Edition of his *Surgery*, Tom. II. Pag. 456. For the more commodious Scarification of these Parts, the Operation is usually performed with the Instrument, *Tab. XXI. Fig. 9*, with which the Tongue may be also depressed at the same Time, the Lancet or *Paristhmiotomus* lying concealed. Instead of this Instrument (which I long ago described and figured with the Form and Position of the *Uvula*, and Tonsils in *Ephem. Nat. Curiosor.* Cent. IV. Obs. 191.) M. PETIT has contrived one which M. GARENGEOT delineates, almost like mine, and says it was first described by VALENTINUS in his *Surgery*: when VALENTINUS in pag. 102. of his said Book, openly declares me to have been the first that described and figured the Instrument.

C H A P. XCV.

Of opening Abscesses in the Tonsils.

I. **B**Y the Neglect or Mismanagement of an Inflammation in the Tonsils, Causes: the obstructing Matter, which ought to have been dispersed, becomes either concremented or suppurated so as to form an Abscess or *Scirrhus*. You ought in this case to forward Suppuration as fast as possible by the Use of Gargles internally, and emollient Cataplasms externally; that the Patient may by this Means not be in Danger of Suffocation, or losing his Speech and Deglutition, by the too great Progress and Continuance of the Disorder. For which Reasons it is also generally unsafe to wait till the Matter makes its own Way through the Tumour; but it ought to be discharged by Incision as soon as you can perceive its Point, or are satisfied there is Matter included: to determine which, requires a strict Examination both by the Eye and Touch.

II. When the Surgeon is assured of an Abscess in the Tonsils, he must invest one of the longest Lancets he can procure, almost up to its Point with a slip of Plaster, so that not above half a Finger's-Breadth of its Point may remain uncovered: then depressing the Tongue by the *Spathula*, *Tab. I. lit. P.* or by the broad Handle of a Spoon, he next intrudes the End of his Lancet in the most promising Part of the diseased Tonsil; whereupon the confined Matter will break forth, and much relieve the Patient from his intense Pains. The Operation may be performed still more commodiously by the *Paristhmiotomus*, or Instrument for scarifying the Tonsils, represented in *Tab. XXI. Fig. 9.* because this will both perform the Office of depressing the Tongue instead of a *Spathula*, and at the same Time scarify or incise with its Lancet which is here concealed, and may therefore be much better used for Infants and timorous Patients, who will hardly or not at all admit of the Knife. Method of Apertion.

III. After having opened the ulcerated Tonsils by Incision, the Patient must gargle several Times in a Day with a Decoction of vulnerary Herbs mixed with Wine or *Mel. Rosar.* after it has been first made warm; in the Use of which he must continue till the Parts are healed. In the mean Time the Patient must strictly abstain from all strong, salt, and spicy Aliments, and from all acrid Medicines; lest any of them, adhering in the Wound, should irritate and excite a new Inflammation, to the Hazard of his Life. Treatment after Incision.

C H A P. XCVI.

Of extirpating scirrhus Tonsils.

I. **T**HE Tonsils are sometimes so much enlarged and indurated after an Inflammation, as almost to shut up the *Fauces*, and prevent the Patient from either breathing or swallowing, especially when both Tonsils are thus disordered at the same Time. 'Tis frequently very difficult, and even impracticable, to dispose such a Tumour of these Parts by the Use of emollient and dis- Description.

cutient Remedies : therefore to relieve the Patient of his Torment, and restore his Deglutition and Respiration; the Surgeon is obliged totally to remove or extirpate them ; which may be performed either by Caustic, Incision, or Ligature.

Cure by Es-
charot.es.

II. With regard to the first Method of removing them by Escharotics, great Care must be taken that none of the stronger Kinds be here used, lest some Part of them escaping into the Stomach should produce a Disorder worse than the Original. The strongest that can be well allowed here is *Ol. Tartari P. D.* or when that fails, a Mixture of *Aqua fortis* diluted with as much Water as will just render it able to dissolve a small Portion of Mercury over the Fire. With these, or such like, the Tonsils are to be touched at Intervals with a Pencil Brush, till they are sufficiently consumed. But in the Application of these Care must be taken not to touch any of the sound Parts, as also not to let the Patient swallow any Food soon after, lest some of the Caustic should be carried down into the Stomach. To avoid both which, the Patient should lean over the Bed or Chair with his Head inclined, that the Saliva and Caustic may run together out of his Mouth, observing to wash and gargle his Mouth before eating. And in this Course the Patient must continue till the morbid Part of the Tonsils, or so much of them as will restore his Respiration and Deglutition are removed ; for it would be not only tedious, but even prejudicial to remove them entirely.

Cure by In-
cision.

III. The second Method used by the Ancients for removing scirrhus Tonsils is that by Incision or Extirpation with a Scalpel, after they have extended and brought them into View by the Hook, *Tab. VIII. Fig. 2.* But this Operation is not only too severe and cruel, but also too difficult in the Performance, to come much into the Practice of the Moderns, because of the obscure Situation of the Tonsils.

Cure by
Ligature.

IV. The third and last Method of removing scirrhus Tonsils is by Ligature, practised chiefly when the diseased Tonsil hangs as it were by a slender Stalk ; in which Case it may be also extirpated without Difficulty by a Pair of Scissars or a Scalpel. To apply the Ligature for removing them, you are advised to use the Instrument, *Tab. XXI. Fig. 7.* which we before recommended for making a Ligature on the redundant Parts of a relaxed *Uvula*. If the Ligature is well made upon the Tonsils, they are said to separate in two or three Days time. The Ends of the Thread or Ligature about the Tonsils are to be secured or fastened on the Outside of the Mouth by a Piece of Plaster, that they may not slip into the *Fauces*. Mr. CHESELDEN has removed scirrhus Tonsils of this Kind by a Ligature, which he conveyed round the Root of the Gland by a bent Probe : but in a scirrhus Tonsil with a broad Root, he perforated the Basis of it with a Kind of Needle and double Thread ; by tying which above and below, the Tonsil came away, as before. See his *Anatomy*, the third Edition, Page 154.

C H A P. XCVII.

Of Tubercles and Excrescences in the Fauces, or near the Tonsils.

IT will not be necessary in this Place to give a prolix Account of the Methods for removing Caruncles and Excrescences in the *Fauces*, or near the Tonsils ; because they may be, and usually are treated in the same Manner as we before

before proposed for removing *Polypuses* and diseased *Tonsils*. Of the removing an Excrecence in the Palate, see ROONHUYNS, *Obs.* 21.

C H A P. XCVIII.

Of extirpating scirrhus, maxillary, and parotid Glands.

I. **T**HOUGH we are furnished with various Methods of removing scirrhus Glands in most other Parts of the Body, yet I cannot meet with any Directions for Extirpation of the salival, maxillary, and parotid Glands, which are frequently indurated and enlarged to a monstrous Size, and which require much Care and Attention in their Removal, as they adhere to considerable Branches of the carotid Artery. What has been advanced in professed Dissertations and *Theses* on these scirrhus Glands regards their Method of Cure by Remedies, and not by Extirpation: and there are even many Surgeons and Physicians who assert the Extirpation of them to be highly pernicious, or even fatal to the Life of the Patient. This Operation neglected hitherto.

II. I must indeed rather commend than disapprove of the Aversion which many entertain against the Operation. For there are so many considerable Branches of the carotid Artery which pass through these Glands, that in extirpating them the Patient may bleed to Death, if not prevented by the Hand of a skilful Operator. Allowed to be dangerous.

III. But it must not be imagined, that this Hæmorrhage can never be suppressed by the Hand of a prudent Operator: or if it should now and then prove impracticable, the Surgeon must sometimes engage in doubtful and dangerous Operations, to preserve the Patient from otherwise inevitable Destruction. And I can assure him I have happily extirpated many parotid and sub-maxillary Glands, which were much enlarged and indurated, and had been in vain treated a long Time with Discutients, Escharotics, and the Methods hereafter mentioned, so as to be irritated almost into a Cancer. But not always fatal.

IV. For the Operation you must be first provided with a good Styptic Liquor, with a large Quantity of Lint, Linen Rags, and some *Bovista*, or Puff-ball, as also some thick Compresses each larger than the other, and a Roller of about six Ells long. These being provided, the Patient is to be seated against the Light with his Head and Hands secured by Assistants; and then the Surgeon opens the Integuments by a longitudinal Incision with the Scalpel, and after freeing them carefully from the Tumour, he at last divides their connecting Arteries with the Scalpel. Hereupon the Blood rushes forth so impetuously, that near a Pound will be lost before the Surgeon can lay down his Knife, and apply the Dressings. Therefore to save the Patient, and suppress the Hæmorrhage, he must instantly apply a Bundle of the linen Rags dipt in Styptic, and press them close upon the divided Arteries. The remaining Cavity of the Wound must be well filled with dry Lint and Rags pressed close with his Fingers; over which must be imposed a large Piece of Puff-ball with three or four Compresses each larger than the other, the whole being at last secured by the *Fascia nodosa* commonly used for Arteriotomy in the Temples. Lastly, you

may observe that when the Tumour is uncommonly large, it may be more convenient to make a cruciform Incision through the Integuments, by which you may extract the Tumour more easily than by a longitudinal one.

Treatment
after the O-
peration.

V. After the Operation is concluded, and the Patient put to Bed, an Assistant ought to sit by the Bed-side, and firmly compress the Dressings on the Wound for several Hours with his Hands, the more effectually to restrain the Hæmorrhage; after which the Patient should keep his Bed quietly for three or four Days, without removing the Dressings, for fear of a fresh Hæmorrhage. The Importance of which last Caution I once experienced by relaxing the Bandage a little, through Impatience the next Day after the Operation: whereupon ensued such a violent Hæmorrhage, though the Bandage was not half off, that I thought we should have lost the Patient, who was a Girl; and I was therefore obliged immediately to re-apply the loosened Parts of the Bandage tighter than before.

Cure of the
Wound.

VI. After the third or fourth Day, you may venture to remove gently the Bandage and Compresses, which will be filled with putrid Blood; and where any Parts of them adhere, you must moisten them with warm Wine or its Spirit, and then you may take off the Puff-ball, with such Parts of the Lint and Rags as are loose. This done, you must re-apply Compresses dipt in warm *Sp. Vin. camp. & Aq. calc.* and secure them with the same Bandage as at first, only not so tight, that the Patient may take his Aliment with more Ease than before. The second and third Dressings after the first should be performed every other Day, and the rest every Day, because the Discharge will be greater. But in every Dressing you ought to remove no more of the Puff-ball Lint, or Rags, than are quite loose, supplying the Place of the last with fresh Lint, spread with some digestive Ointment. And thus you are to proceed till all the Puff-ball, Lint, and Rags, are digested off spontaneously without any Evulsion, which is generally performed within eight or ten Days. The Wound must be now incased by dressing with digestive Ointments and vulnerary Balsams, and the Cicatrification of it finished by dressing with dry Lint only. Lastly, you ought to observe in the Operation to make your Incision behind the Jaw, that the Cicatrix may not disfigure the Patient's Face.

M. GAREN-
GEOT cen-
sured.

VII. 'Tis something extraordinary that M. GARENGEOT, who is so ample in other Points of Surgery, should take little or no Notice of the Methods to suppress the Hæmorrhage in his Chapter on the Extirpation of scirrhus Glands. He even falsely asserts there, that you will not have any Occasion for Medicines to stop Blood in the Extirpation of those Glands or of scirrhus Breasts, because only a few Drops of Blood will be spilt even in removing the largest of these Tumours; and the Wound itself too, he says, you may heal very easily, provided you close the Lips of it well by Suture. But I think it is from hence very apparent that, in the general Doctrine of that Chapter, he had either no Regard at all to the Extirpation of scirrhus Parotids, or else he never saw the Operation performed: though he affirms he was very frequently present at the Operations of the most expert Surgeons in *Paris*. Had M. GARENGEOT ever been present at the Extirpation of a Parotid, he would not have affirmed it so easy to stop or restrain the Hæmorrhage, and heal the Wound. Hence we may also see the pernicious Consequence of writing in general Terms, without Specifications or Exceptions. For should any one be as careless of the Hæmorrhage in extirpating a scirrhus Parotid, as one would think he might from

M. GAREN-

M. GARENGEOT's Writings, the Patient would be inevitably lost, as happened to a Surgeon at *Jene* in this Operation^a: though I will not deny but his Assertion may hold in the Extirpation of most other scirrhus Glands in the Body. We may from hence also conclude, that this is an unusual Operation at *Paris*: but we meet with the Extirpation of scirrhus Parotids performed among the *Dutch* by ROONHUYSE (*Obs.* 1.) and TILINGIUS in his Additions to SCULTETUS (*Art.* II. pag. 39 and 54.) which were published at *Leyden* before the Year 1693.

VIII. But after all, the prudent Surgeon will not be over hasty to undertake this dangerous Operation, before the more gentle Methods have been tried in vain; because we frequently find that Indurations and Tumours of those Glands, both in Infants and Adults, are often dispersed by the Use of proper Medicines, especially when they are not inveterate, or of long standing: therefore the Use of Medicines should always be called in before the Knife. It will be often found extremely serviceable in these Tumours to bathe them every Day with some of the warm Oils, as the *Ol. Laterum, Saponis, Camphoræ, Succini, Juniperi &c.* defending them afterwards with a Mercurial or Soap Plaster, to disperse the indurated and obstructing Matter; which may be also promoted by the frequent Application of warm Bags filled with discutient Herbs.

IX. In the mean Time you must also take in the Assistance of internal Medicines, from whence the greatest Part of the Cure is to be expected. Such are Decoctions of the *Rad. Vincetox. aut scrophular. cum Pulv. è Spongia usta, Sal. Gemmæ, Ant. diaphorat. &c.* Calomel and *Æthiops* I have experienced great Effects from, in these Cases; observing to give the Patient a lenient Purge at Intervals. And when all other Remedies take no Effect; if the Patient is willing you may try a Salivation. This AGRICOLA and other eminent Physicians recommend, and I have in many Cases experienced to be highly serviceable in removing Obstructions and Indurations of these Glands.

X. If a Scirrhus of these Glands is accompanied with an Inflammation, and you cannot disperse the same, it may not be improper to strive to bring it to Suppuration, and then to treat the Tumour as an Abscess. For I have known several Instances, in which scirrhus, parotid, and sub-maxillary Glands, with Concretions in the Neck, having been treated with Discussants, in order to disperse them, have, by that Means, degenerated into Abscesses. But when Scirrhuses of this Kind are inveterate, emollient and suppurative Medicines will, instead of digesting them, frequently increase the Tumour, and at last convert it into a Cancer, or a malignant Ulcer: which are also the usual Consequences of treating them with Escharotics or Caustics. These last can never be used without inducing a Cancer, a dangerous Hæmorrhage, and probably the Death of the Patient, as I had lately an unhappy Instance in a Person of Quality.

^a This Case is described at large in the *Commerc. Lit. Norimberg. An.* 1733. pag. 61. where the Author observes, that we may from thence see how much safer it is to relinquish than to extirpate these Tumours, which however ought not to deter prudent Surgeons from the Operation when absolutely necessary; for I have frequently performed it with Success, without losing one of my Patients therein.

PART II. SECT. III.

Of Disorders in the NECK, curable by the Hands and Instruments.

C H A P. XCIX.

The Method of extracting and removing small Bones of Fish and other Animals, Plum-stones, Pins, and Needles, &c. sticking in the Fauces or Gula.

AS the most acute Pains and Inflammation, with a Train of malignant Symptoms and sometimes Suffocation, are frequently occasioned by foreign Bodies sticking in the *Fauces* or *Œsophagus*; it ought to be the principal Care of the Surgeon to remove them with all possible Expedition. To effect this, the Patient may be directed to a large Draught of some Liquor, or to forcibly swallow a large Mouthful of Bread, Meat, or Pulp of some Fruit. But if the Disorder be rather made worse than better by these Attempts, he must then have immediate Recourse to some Instrument. The Tongue is to be first depressed with a Spatula, in order to observe whether the Obstacle can be seen: and if it appears near the upper Part of the *Œsophagus*, it should be cautiously extracted by introducing a Pair of Pliers in *Tab. III. Fig. 3.* or by some such other Instrument. But if it is lodged deep in the *Œsophagus*, he may then give the Patient a Piece of Sponge to swallow that has been first dipt in Oil and well fastened to a strong Cord, by which it is to be pulled up again, after it has been swallowed by the Patient as far as it will go: by which Means the Body sticking in the *Œsophagus* will be by the Sponge forced down into the Stomach, or else drawn up into the Mouth. But the same Intention may be answered better, if the oily Sponge be fastened to a long Whalebone Probe (as at *Tab. XXI. Fig. 10. BB*) and then gently thrust into and drawn out of the *Œsophagus*. This last Instrument has been successfully used by myself, in a Countryman, who had a Bone as big as one's Thumb stuck in his *Fauces* above four and twenty Hours; but was by this pressed down into his Stomach, and the Man recovered: after which I several Times experienced the Success of the same Instrument in others. Some Surgeons have described and figured several other Instruments for this same Purpose, as *HILDANUS Cent. 1. Obs. 26.* *SCULTETUS Tab. VI.* and *GARENGEOT* in his *Treatise of Instruments*. But if neither of them, nor the fore mentioned, are at hand, a Piece of flexible Wax-candle, of about two or three Spans long and Thickness of one's Finger, may be sometimes conveniently used in their Stead. For other Methods of Practice and curious Observations on this Subject, I refer you to the *Memoires de l'Académie de Chirurgie. à Paris, 1743. pag. 444.*

C H A P. C.

Of the BRUSH for scouring the Stomach.

RELATED to the foregoing Instruments is the *Excusio Ventriculi* or Cleanser of the Stomach, as it is called by some of our modern Physicians; being composed of soft Hair, fastened by twisted Brass or steel Wire into a *Fasciculus*, as in *Tab. XXI. Fig. 11.* the Handle or Stem of which may be invested with Silk or Thread. This Instrument is recommended by several eminent Physicians as being principally useful to scower or cleanse the Stomach as well as remove foreign Bodies out of the *Fauces* and *Œsophagus*. The Directions they give for the Use of it, are always to let the Patient drink a small Draught of warm Water; others recommend Spirit of Wine before the Operation, that the Mucus and Foulness of the Stomach may be washed off thereby. Then the Brush A being moistened in some convenient Liquor is to be introduced into the *Œsophagus*, and slowly protruded into the Stomach by twisting round its Wire-handle BB. When arrived in the Stomach, it is to be drawn up and down, and through the *Œsophagus*, like the Sucker in a Syringe, till it be at last wholly extracted. Some recommend plentiful drinking in the Operation, to be continued till no more Foulness is discharged. But though this Contrivance is greatly extolled, and said to prolong Life to a great Age, especially if practised once a Week, Month, or Fortnight: yet there are very few Instances of its happy Effects. And if there were, I believe few would be willing to suffer the Pain, Danger of Suffocation, and other Injuries which attend the Use of so offensive an Instrument. More may be seen in this Head on a Controversy published on the Subject, between WEDELIUS and TEICHMERIUS: In which this is demonstrated to be no new Instrument, having been long before described by others.

C H A P. CI.

Of the WRY NECK.

WE sometimes meet with People who have their Necks and consequently ^{Rise of the Disorder.} their Heads distorted more to one Side than the other; which is by TULPIUS^a and others termed *Caput Obstipum*, probably after HORACE^b. This Deformity is usually brought into the World with the Infant, or else occasioned afterwards by some Accident. When it is from the Birth, there is hardly any room to expect a Cure, because the Vertebrae of the Neck are rendered crooked by that Posture, while the Bones are in a soft and pliable State: though there are some surprizing Instances in TULPIUS^c, MEEKREN^d, ROONHUYNS^e, of young People who have had the wry Neck from their Birth for the Space of 12, 16, or 18 Years;

^a Observ. Medic. Lib. IV. Cap. 58.^b 2 Satyr. ver. 92.^c Loc. citat.^d Obs. Chirurg. 33.^e Obs. Chirurg. 22 and 23.

notwithstanding which, they have been restored to their natural Straightness and Uniformity. When the Disorder comes by Accident after the Birth or in Adults, the Cause is usually a Contraction of the Skin on one Side by burning, or from a Spasmodic and a strong Contraction of one of the Mastoide Muscles, represented at *Fig. 12.* A A. which at length becomes shorter and indurated by continuing in that Posture: or it may proceed from a Relaxation of one or more of those Muscles, in consequence of which the Neck will be contracted by the stronger antagonist Muscle on the opposite Side. Or lastly, it may in the Opinion of ROONHUYNS proceed from a preternatural Ligament drawing down the Head. When either of these are the Cause of this Disorder it ought not to be rejected as incurable, especially if it appears to be of no long standing and in a young Subject.

First Method of Cure.

II. In order to cure this Disorder, if it be recent, and caused by a Catarrh or Defluxion of superfluous Humours, evacuating Medicines, with the Administration of mild Sudorifics and Heat are very serviceable. But when it arises from other Causes, and particularly the forementioned Contraction of a Muscle, or of the Skin by burning, the Surgeon then ought to try the Use of Fomentations and Ointments with emollient Oils and Emplasters, by the repeated Application of which the contracted Parts may be sometimes relaxed. In the mean Time the Head is to be held inclined towards the opposite Side by a proper Bandage for this Purpose. NUCKE and SOLINGEN direct us to a proper Instrument made of Steel with a soft Collar as in *Tab. XXI. Fig. 13.* The Collar of this Instrument marked A A being put upon the wry Neck, and fastened by a Rope to the Ring C, the Patient is to be suspended thereby several Times in a Day, once every Quarter of an Hour, or as often as may be convenient, till the Neck has acquired its straight and natural Position. If these Means prove of little Service, as TULPIUS and ROONHUYNS tell us they frequently are, or if the Disorder is become too inveterate, the Surgeon should then proceed to the Operation.

Second Method of Cure.

III. Therefore if the Disorder proceeds from a Contraction of the Skin by burning, it will be necessary to divide the contracted Parts of the Skin by one or more transverse Incisions, made with great Caution to avoid wounding the jugular Vein. The Incisions are afterwards to be dilated by dressing them with dry Lint, and treated with some digestive Ointments, as in other Wounds; taking Care to keep the Neck all along inclined towards the opposite Side by a proper Bandage, till it is sufficiently elongated on the contracted Side by the new Supplies of Flesh and Skin in the Incisions, to restore the Head to its right Position.

Third Method of Cure.

IV. But if the wry Neck proceeds from a Contraction of one of the Mastoide Muscles, or from some Ligament, they are to be divided by a transverse Incision, with the crooked Scalpel in their lower Part near the Clavicle or Sternum, taking Care to avoid any considerable Artery or Vein that might occasion a dangerous Hæmorrhage. In order to stop the Blood after the Operation, the Wound is to be filled with dry Lint, and afterwards healed with a large Cicatrix by digestive Ointments, with *ol. Hyperici*, *Bals. Capiv.* which are recommended by ROONHUYNS. TULPIUS, MEEKREN, and ROONHUYNS, indeed, tell us of Cases that have occurred to them, in which the Head has immediately recovered

vered its proper Position, upon dividing the preternatural Ligament or Tendon by which it was inflected. For the rest, in all the Methods of Cure a proper Bandage seems necessary, to retain the Head and Neck in a proper Posture, till they have recovered their natural Situations: concerning which Bandage Authors are silent, as are all the modern *French* Surgeons upon this Disorder, and its Method of Cure, which seems a little surprizing. But they who desire more particular Observations on this Subject may consult TULPIUS, Lib. IV. Cap. 58. with MEEKREN, Cap. 33. and ROONHUYNS Obs. 22, 23.

C H A P. CII.

Of BRONCHOTOMY, LARINGOTOMY, or TRACHEOTOMY.

I. **B**Y all these Names is intended an Opening or Incision made in the *Aspera Arteria* or Windpipe: which is necessary in many Cases, and especially in In what Cases this Operation is necessary. (1) a violent Quinsey, to prevent Suffocation from the great Inflammation or Tumor of the Parts. (2) When a Bean, Pea, Plumb, or Cherry-stone or some such Bodies are slipt into the Trachea, and seem to threaten Suffocation: (3) And lastly, this Operation may be practised upon People that have been lately drowned, and are not yet entirely suffocated: for by dividing the Trachea and inflating Air into the Lungs of such Persons several have been recovered. I am not altogether ignorant that many Physicians are averse to this Operation, either esteeming it dangerous, deadly, or inhumane. But those Gentlemen are greatly mistaken: for the small Wound made in the Trachea by this Operation, is so far from killing, that even much larger, which are not made with this Intention, are not to be judged mortal, as we intimated in treating of Wounds in this Part. So that we cannot help thinking with CASSBRIUS, that those are both ignorant and timorous, who rashly neglect this safe, easy, and often salutary Operation in the forementioned Cases.

II. When this Operation is to be performed, the most convenient Part of the *Trachea* to be opened, is between the second and third of its annular Cartilages: though it may be also opened much lower without Danger. The Method of proceeding, especially when any Stone, Bean, Pea, or the like, are to be extracted, take as follows. In the first Place, the Patient is to be inclined backward upon a Bed or in a Chair, and his Head held firm by an Assistant, who is to stand at his Back: then the Skin, Fat, and Muscles, are to be divided by making a longitudinal Incision with a Scalpel according to the Length of the *Trachea*, beginning about two Fingers Breadth below the Scutiform Cartilage, and continuing it for the Space of two, three, and in tall People four Fingers Breadth. See *Tab. XXI. Fig. 14. AA.* Then the Sides of the Wound are to be drawn asunder by an Assistant, either with proper Hooks or his Fingers, and after wiping off the Blood with a Lint or a Sponge to render the *Trachea* conspicuous, three or four of its annular Cartilages are to be divided in a right line: by which Means the Body lodged in its Cavity may be found by searching with a Probe, and afterwards extracted by a Hook or Pliers.

When the Operation is finished, the Wound is to be cleansed with a Sponge, and dressed with some sticking Plaster, retained by Compress and Bandage: and afterwards it may be treated with some vulnerary Balsam, as mentioned in our treating of Wounds in this Part. By these Means I happily extracted a Piece of a boiled Mushroom, which slipped into the *Trachea* of a jocose Man at *Helmstadt*, with Danger of Suffocation by Laughing, while he was eating Broth, in which Mushrooms were boiled. By the same Method RAVIUS told me he happily extracted a Bean which had fallen into the *Trachea*; notwithstanding the rest of our modern Surgeons are negligent on this Head. Some Surgeons advice that Kind of Suture which is used in the Hare-Lip for the more speedy and uniform Cicatrification of the Wound in this Part. But in my Opinion that Apparatus may be properly omitted, as it usually gives great Pain and Uneasiness to the Patient, and as the Wound may be cured by a Treatment much milder and equally safe.

How Bron-
chotomy
should be
performed in
a Quinsey.

III. When repeated Bleeding and the Use of proper Medicines take no Effect in a Quinsey, this Operation may be necessary to prevent the Patient from being suffocated. In this Disorder there are three Ways of performing *Bronchotomy*, each of which we shall describe in order. The first is by placing the Patient in a supine Posture, his Head being held firm by an Assistant, as before. The Surgeon then proceeds to make an Incision in the Integuments to the *Trachea*; or the Skin may be elevated by the Surgeon and an Assistant, and afterwards divided longitudinally together with the Fat and Muscles which cover the *Trachea*. Some advise these Muscles to be cautiously separated from the *Trachea* or from each other: but that is not necessary, and these Muscles may be safely incised without Danger. When the Integuments have been divided, the Wound is to be cleansed, and the Blood stopped with a Sponge which has been dipt in warm Wine or its Spirit, while the Assistant draws one Side of the Wound from the other, with Hooks or his Fingers. Then the Surgeon makes an Incision with his Scalpel between two of the annular Cartilages, or else, as I have sometimes seen, by dividing one of the Cartilages in the Middle, at the same Time; after which he may easily introduce a small round or flat Tube of Silver or Lead, as we have represented in *Tab. II. Litt. TUX*. But before the Surgeon withdraws his Knife out of the Incision, it may be proper for him to insert a Probe by the Side of it, by which Means he may afterwards more easily introduce the Cannula. This Cannula or Tube is to be fastened to the Neck with a Ligature passing through Rings or small Holes in its Side, and held firm in its Place by a Piece of perforated Emplaster, being careful that the End of the Tube does not touch the back Part of the *Trachea*, and occasion a troublesome Cough. But to prevent the external Cold and Dust from injuring the Lungs, it may be proper to let the Air pass through a Piece of Sponge in the Tube, which should be frequently dipt into, and expressed out of warm Wine; or, as GARENGEOT advises, through a Piece of fine Lint, having a Piece of perforated Emplaster behind it. This being performed, the Patient may be bled in the Arm, Foot, Neck, or under the Tongue: and Clysters, Gargles, with a Cataplasm under the Chin, cupping on the Sides of the Neck, with other Medicines proper in Quinseys, should be diligently applied, till the Patient either recovers his Respiration or wholly expires, one of which usually happens within four Days after the Operation. When a free Respiration

piration by the Mouth succeeds two or three Days after the Operation, which may be known by stopping the Orifice of the Tube with a Finger, it may be then taken out, and the Wound afterwards dressed and treated as we before directed. But if the Difficulty of Respiration still continues, it should be continued in its Place with the other Remedies, till Death or a free Respiration puts a Period to the Experiment.

IV. Another and more ready Way of opening the *Trachea* is by inserting a double edged Scalpel, at one and the same Time, through the Skin, Fat, Muscles, and *Trachea* itself: after which a proper Tube may be introduced and retained as before. By this Method the Operation may not only be performed in a much shorter Time, but the Wound will be made much less and the sooner healed. The third and last Method of *Bronchotomy* is by an Instrument consisting of a small Tube, in which is contained a triangular Needle called a Trochar, represented in *Tab. XXI. Fig. 15, 16.* This Instrument is so managed, as to pass through the Middle of the *Trachea* by one push, and after drawing out the Needle from the Tube, the latter is left in the Wound till the Patient recovers. This Method much exceeds the rest, as it may be more easily and expeditiously performed, and occasions the least Wound and Pain to the Patient. The Dressings, &c. are to be performed the same here as in the first.

The second and third Way of performing this Operation.

V. We must not here neglect to advise the Performance of this Operation in Time, while there is sufficient Strength and Hopes of the Patient's Recovery; for when the Patient is spent, it is usually performed in vain. We may also add, that it will be prudent to call in the Assistance of some eminent Physicians before the Operation be undertaken, in dangerous Cases. Otherwise the Surgeon might suffer in his Character, by the Declamations of those ignorant of his Profession, who, from the Singularity of the Operation, may sometimes, in unsuccessful Cases, give out that he has cut the Patient's Throat or killed him.

The Operation should be timely performed.

VI. If a drowned Person has but just expired, or not continued long under Water, the most certain and expeditious Way of recovering him will be by opening the *Trachea* with a Scalpel or such other Instrument as is nearest at Hand, and afterwards to inflate or blow into his Lungs either with the naked Mouth (as Delay is dangerous) or else with a Tube. For by this Means, if timely administered, the Breath and Life of a Person thus suffocated may be surprizingly restored, as DETHARDINGIUS, present professor of Physic at the *Hague*, has lately declared in a particular Dissertation upon this Subject.

The Method of recovering such as have been drowned.

VII. As this Operation is performed neither in the *Larynx* or *Bronchia*, but in the *Trachea* or *Aspera Arteria*, it ought not to be called *Bronchotomy* or *Laryngotomy*, as it commonly is by the Generality of Physicians or Surgeons; but *Tracheotomy* from the *Trachea*. This Operation has been treated of in a particular Dissertation by FRID. MONAVIUS and SCHACHERUS Professor at *Leipsick*. JULIUS CASSERIUS has also described and illustrated this Operation with elegant Figures in his Treatise *de Vocis Auditusque Organis*, p. m. 119. RENATUS MOREAU and TH. FIENUS have discoursed learnedly on this Operation, the first in his Epistle *de Laryngotomia*, and the last in his Book of Surgery.

Concerning the true Name and Writers of this Operation.

C H A P. CIII.

Of strumous or scrophulous TUMORS and BRONCHOCELE.

Struma
what it is,
and its
Cause.

I. **A**LMOST any Kind of Tumor which is formed in the anterior lateral Parts of the Neck near the Skin is usually denominated strumous or scrophulous: though there is a great Variety and Difference in the Nature of these Tumors, some being small, some of a moderate Size, and others so much enlarged as to cause Stupidity: Some are soft or moveable, others hard or immoveable; some of a mild Nature, and others of a malignant or cancerous Disposition. But with Regard to the Cause of these Tumors, they are usually formed of indurated Glands in the Neck, as the small moveable Glands, the superior and inferior salival Glands, and sometimes the thyroide Glands, which are by some strictly called Scrophulæ or the Evil, by the *French* *Ecouelles*. Some of them are related to encysted Tumors, and therefore contain a hard or softer Substance like Cheese, Suet, or Lard. But if a Tumor arises in the anterior Part of the Neck from the resisting Flatus or Air, some Humour, or other Violence, as straining in Labour, lifting of Weights, &c. the Disorder is then usually called a Bronchocele. In my Opinion it should rather be termed *Tracheocele*. It is remarkable, that some Nations are quite free from this Disorder, while others are grievously afflicted therewith: among which latter we may reckon the Inhabitants of *Spain*, *Germany*, *Sweedland*, *Bavaria*, *France*, *Helvetia*, and especially the Inhabitants of *Tirole*, who have these Tumors (but flaccid) sometimes in such a Degree, that they extend to their Navel, even down to their Knees. See MITTERMAYER's Treatise on strumous and scrophulous Swellings. The Cause of which Peculiarity in the Spreading of this Disorder among certain People, is supposed to reside either in the Air or Waters of those Countries: but in what Manner they operate to produce those Effects has not yet been explained by physical Writers, though we are furnished with many specious Conjectures and Opinions. These Tumors rise in various Parts of the Neck of some Women after a difficult Labour. There is another Difference in scrophulous Tumours, that some are milder and without any Pain, while others are inflamed, painful, or indurated, so as to be scirrhus, and in some Measure cancerous, obstructing the Office of Respiration and Deglutition. But of what ever Kind these Tumors are, when they are once become inveterate, they are very difficultly, if ever curable by Medicines: but if they are recent, they may be sometimes dispersed, especially when the Tumor is from an Induration of the Glands. We are informed that the *French* and *English* Kings have possessed a very easy Method of curing this Disorder, barely by touching the Parts affected. But we have not Opportunity at present to enter minutely into this Matter; they who are desirous of more, may consult LAURENTIUS in his Treatise *de mirabili Strumas sanandi vi, solis Gallie Regibus divinitus concessa*: as also JOHN BROWNE in his Treatise of strumous Glands, where he vindicates the Right and Virtue of the regal Touch to belong to the Kings of *England*, adding many Examples for the Confirmation thereof.

II. In

II. In order to cure strumous or scrophulous Tumors of the recent Kind, Treatment of recent Strumæ. nothing is more conducive than a proper Regimen of Diet and Way of Living, especially when assisted with a good Air and the Use of internal Medicines, such as Discutients, Attenuaters, and cooling Purges, ordered according to the Age and Constitution of the Patient, as we before advised at Chap. XCVIII. in treating of scirrhus Glands in general, and particularly of the salival Glands. The celebrated Mr. BOYLE greatly extols the *Ruta Muraria*, as a Specific in these Disorders. SCULTETUS recommends *pulv. lacertarum* macerated in Water, and afterwards dried; or *pub. ex. rad. zinzib. turpeth. & saccharo*. Some prescribe *burnt Sponge*, or *pulv. ad strumas*: Others, *rad. Scrophular*, or *Decoct. lign. cum rad. Bardano*. But the internal Means should also be assisted by a discutient Ointment externally: as

℞ *Merc. Crud.* ℥i. *Terebinth Venet.* ℥ii. *Subacti, Axung. Porcinæ, quantum sufficit pro Ung.*

This Ointment should be rubbed in upon the Tumor every Day for a considerable Time, applying afterwards *Empl. de ranis cum Mercurio, de Cicuta*, or *Diasaponis*. But during the Use of these it will be proper to give the Patient a gentle Purge once a Week, to prevent the Mercury from causing a Salivation. SCULTETUS and FABRICIUS AB AQUAPENDENTE greatly extol the following Ointment in this Disorder.

℞ *Ol. Laurin.* ℥i. *Alumin. Rup.* ℥ss. *Sal. commun.* ℥ii. *m. f. Ung.*

Instead of which, others use the *Ol. Philosoph.* or *Petroleum alb.* either alone or mixed with *Ol. Sapon*. There are also good Effects promised from wearing a leaden Collar that has been mixed with Mercury, especially when the scrophulous Tumor or Bronchocele are recent: at least it prevents them from growing bigger, if it does not entirely disperse them. There are some who advise to rub the Tumors well with the Hand or a Bone of a dead Man; and others direct to more superstitious Means, which they suppose to act by Sympathy. But we must frankly own, our Opinion is, there can be little or nothing in such a Practice.

III. If the strumous or scrophulous Tumor is of long standing, but moveable, Treatment of inveterate Strumæ. it may be then better removed by the Knife than by Medicines. The moveable Tumors of this Kind may be extirpated by the Scalpel, while those which are fixed and lie deep in the Neck, cannot be safely removed without Prejudice to the Patient, unless they happen to be of the softer Kind. In extirpating these Strumæ or Scrophulæ, there is no small Danger of wounding some of the large Arteries, Veins, or Nerves of the Neck by the Scalpel, which would occasion Death or some very bad Symptom. GARENGEOT and PETIT affirm that no scirrhus or indurated Glands detach any Roots into the adjacent Parts, notwithstanding they appear to be fixed or immoveable, and that therefore the immoveable Kind of Strumæ may be safely extirpated. But as they produce no Instances of Success from this Opinion, there is no doubt but it will be rejected as precarious by the Generality of prudent Surgeons. For the Extirpation of moveable Strumæ there are three Methods chiefly in Use: the first of which is by Ligature, when the strumous Tumor hangs by a slender Part like a Stalk, which

which is not very frequent. But if the Tumor is not pendulous, or if it be connected by a large Root, it is then to be removed by the second Method with a Scalpel. In order to this a cruciform Incision is to be made upon the Middle of the Tumor down to its proper Integument: then the wounded Parts are to be separated by the Knife from the Tumor, which is to be afterwards taken hold of by the Hook, Needle, and Thread, or a convenient Pair of Pliers, and by that Means taken out as we have directed before, in treating of encysted Tumors. During the Operation an Assistant is to dry up the Blood from the Orifice of the Wound, by repeated Applications of Lint or Sponge, that the Surgeon may have a clear View of his Work: and if by Accident a large Blood-vessel should be divided with the Root of the Tumor, it is to be closed by applying *Sp. Vin. Rœt.* or some styptic and astringent Medicine; and if these fail, a Ligature or actual Cautery. And lastly, the divided Parts of the Skin are to be brought close to each other by a Piece of sticking Plaster, and placed uniform, so as to unite without leaving a disagreeable Cicatrix: the Remainder of the Treatment may be conducted as in other Wounds. I have several Times opened some of the softer Strumæ or Scrophulæ either with a Scalpel or Caustic, and after discharging their Contents and cleansing the Ulcer, have performed the rest of the Cure as in other Wounds. As these Tumors are usually without Pain, it is not at all surprizing that they should be neglected by the Generality of People, who are both poor, careless, and fearful of the Surgeon's Hand; and that more especially, if they think the Tumour and Ornament, like the Inhabitants of *Tyrole*. If a Patient should be desirous of being freed from this Disorder without the Knife, it may be done with Caustics^a; as we have directed in Tubercles and Excrescences. But you must be careful not to undertake this Method of Cure, in any but the more soft and mild Kind of Strumæ, seated not near any large Vessel nor too deep in the Neck: otherwise the Tumor may be converted from a strumous to a cancerous Disposition, or at least malignant Symptoms brought on, which would endanger the Patient's Life, by injuring the large Veins, Arteries, Nerves, or Trachea seated in those Parts.

C H A P. CIV.

Of SETONS.

First Way of I.
making a
Seton.

A Seton is a few Horse-hairs, small Threads, or a larger Packthread, drawn through the Skin, chiefly of the Neck, by Means of a large Needle or Probe, with a View to restore or preserve Health. There are chiefly three Methods of performing this Operation practised by Surgeons. The first is by taking up the Skin in the lower Part of the Neck, while an Assistant draws it tight about an Inch above, then the Surgeon passes through the Skin a large and crooked Needle (*Tab. XVIII. Fig. 12. or XXII. Fig. 9.*)

^a Some reject Caustics altogether, but very unreasonably; for they are often of great Service, if judiciously applied. *CÆLUS* recommends them as excellent Remedies in these Disorders. *Lib. vii. c. 13.*

with a Silk or Thread, either twisted together into a large String, or in 20 or 30 small and loose Threads: which being drawn through the Skin are to be left in the Neck after the Needle has been removed (*Tab. XXI. Fig. 17.*) The Wound is then dressed with some digestive Ointment, and covered with a Piece of Plaster, perforated on each Side for the Ligature to pass through: and thus the Seton is decently compleated. The Name seems to be derived from *Seti Equini*, or Horse-Hairs; which were by the Ancients used instead of Thread. But our Modern Surgeons changed them for Thread of Silk or Flax, which are much more easy to the Patient. The Ligature is to be shifted or drawn through the Wound a little every Day, and the Matter is to be wiped off every Morning and Night as in Issues; by which Means it will degenerate into an Ulcer with a double Orifice, making a copious Discharge daily: and when one Ligature is become foul and unfit for Use, a fresh one may be introduced by fastening it to the End of the old, which may be then drawn out.

II. The second Way of making a Seton differs little from the former, only instead of a large Needle a double edged Scalpel or Lancet is made use of (*Tab. I. Litt. B or I*) and having fastened the Ligature to a Probe, it is thereby to be introduced through the Wound: by which Means a larger Aperture is made with a Knife than with a Needle, and a larger Quantity of Matter thereby discharged. One of the best Instruments for this Operation is exhibited in *Tab. XXIII. Fig. 5.* which should be fitted with a Handle; and after it has been forced through the Skin to the Part B, and the Ligature drawn out of the Aperture or Eye marked A, it may be again drawn back out of the Wound, leaving the Ligature behind.

I. *Litt. B or I*) and having fastened the Ligature to a Probe, it is thereby to be introduced through the Wound: by which Means a larger Aperture is made with a Knife than with a Needle, and a larger Quantity of Matter thereby discharged. One of the best Instruments for this Operation is exhibited in *Tab. XXIII. Fig. 5.* which should be fitted with a Handle; and after it has been forced through the Skin to the Part B, and the Ligature drawn out of the Aperture or Eye marked A, it may be again drawn back out of the Wound, leaving the Ligature behind.

III. The third Manner of performing this Operation is by an Instrument for the Purpose, described and represented for the Purpose by HILDANUS, FABRIC. AB AQUAPENDENTE, SCULTETUS, and others; by which the Skin is pinched up, and perforated with a sharp-pointed and red-hot Iron, after which a Ligature is introduced as before. As this Operation is attended with great Pain and consequent Suppuration, it is not at all surprizing that it should be approved of by many eminent Physicians, to make a strong Revulsion and copious Discharge of offending Humours from the Head, Eyes, and more noble Parts.

IV. Some have been and are of Opinion that a Seton made longitudinally according to the Length of the Neck, is much more efficacious than the transverse. But I could never observe any material Difference, though I have sometimes designedly used this Way of operating: in which I always found much more Difficulty, because the Skin cannot be so easily taken up, nor the Scalpel or Needle introduced in the longitudinal, as it may in the transverse Direction. In this Method, the Head is to be inclined backward, the Skin taken up, and perforated by a very crooked Needle (*Tab. XXII. Fig. 9.*) which may be done better by holding the Skin up with a Pair of Pliers rather than the Fingers, especially those made for the Polypus (*Tab. XIX. Fig. 10.*) being perforated with an oblong Aperture near the Extremity of their Mouth.

V. There are many Physicians and Surgeons who esteem Setons to be of little Consequence in the Cure of Disorders, especially DIONIS and GARENGEOT: whereas others, on the contrary, propose it to be one of the best Means

of relieving many chronical and obstinate Disorders, particularly those of the Head; such as Drowfiness, Head-achs^a, Epilepsy, and Disorders of the Eyes. And as it is certain many superfluous and pernicious Humours may be drawn from the Parts affected, and be this Way discharged, we need not wonder that a Seton should be preferred by many Physicians as more effectual than a Pair of Issues. We also find, by Experience, that they are very useful in the Hydrocephalus, Catarrhs, Inflammation, and other Disorders of the Eyes, Gutta Serena^b, Cataract, and incipient Suffusion: to which we may add intense Head-achs, with Stupidity, Drowfiness, Epilepsies, and even the Apoplexy itself. But as Setons are usually attended with much Uneasiness and Trouble, their good Effects are but seldom experienced by Patients in those Disorders.

PART II. SECT. IV.

Of Disorders of the THORAX, coming under the Province of Surgery.

CHAP. CV.

The Manner in which the Nipples of the BREASTS in Women may be drawn out, extended, and milked.

I. **T**HE Nipples of some young Women who have never lain in before, are frequently so small and sunk into the Breasts, that the new-born Infant cannot lay hold of them, so as to suck out the Milk. In this Case, it may be necessary to apply an Infant that can draw much stronger, or has been used to suck, or else an adult Person, who is expert in this Practice. But if neither of these can be conveniently obtained, and the Infant does not draw out the proper Quantity of the Milk, it may be then more decent as well as convenient to apply an Instrument adapted to this Purpose. Such is, 1. A sort of Glass represented in *Tab. XXI. Fig. 18.* the larger Part of which marked A is to be applied like a Cupping-glass upon the Nipple, and the Tube BB is to be sucked in the Patient's own Mouth. This should be repeated, till the Nipples are so much extended, as to be easily taken hold of and sucked by the Infant. 2. If none of those Glasses are at hand, the same Intention may be answered by applying a Tobacco-pipe in like Manner. 3. Others apply a small Cucurbite made of Ivory or Alabaster in the Form of a Hat, as at *Fig. 19.* which they suck strongly in their Mouth. 4. I have by me another Sort of

^a RUYSEN gives us a remarkable Instance of an inveterate Head ach, that ceased upon the Application of a Seton; on removing the Seton the Pain returned, and this several Times successively. See *Observ. 40.*

^b In SCULTETUS we have the Case of a young Woman, who was cured of a *Gutta Serena*, by Means of a Seton: when all other Methods had been tried in vain, as frequent Bleeding, Purging, and Issues. See his *Observ. 25.*

Glass, which may be called a sucking Glass, represented at *Fig. 20.* this being made hot with warm Water, or held before a Fire, so as to rarify and expel the Air, and its Mouth A applied over the Nipple, it will be not only extended or drawn out, but will also discharge a considerable Quantity of Milk, which will take down the Inflammation and Tumor of the Patient's Breast. When the sucking Power of the Glass is grown very weak, the Milk may be let out at the Aperture B which was before stopped up with Wax: and after heating the Glass again, as in Cupping, stopping up the Hole again with Wax, it may be applied successively as long as may be requisite. Lastly, young Whelps, who have not yet any Teeth, have, by some, been applied with Success for the same Intention.

C H A P. CVI.

Of chapp'd and sore NIPPLES.

IT is a common Calamity of lying-in Women, who suckle their own Children, to be troubled with Fissures and Ulcerations in their Nipples, attended with great Pains. They will receive the most Benefit from the Application of *Mucilag. ex Sem. Cydon.* or a Mixture of *Ol. Over. & Ceræ*; or lastly, a fine Powder of *Gum. Tragacanth. vel Arabic.* which may be sprinkled on through a Piece of Muslin, as there may be Occasion. But then the Infant should suck the sore Nipple as seldom as possible, that it may heal without Interruption: and the Shift or Linen should be also kept from adhering to it. In order to which, when the Infant has done sucking, the Nipple may be washed in a Solution of *Sacch. Saturn. in aq. Plantag.* defending it afterwards with a Cap of Ivory, Marble, or White-wax, like that in *Tab. XXI. Fig. 19.*

An EXPLANATION of the TWENTY FIRST PLATE.

Fig. 1. Represents the Manner of dividing the Frenulum of the Tongue in Infants by the Scalpel.

Fig. 2. Shews how the same is to be done with a Kind of Fork and Pair of Scissars.

Fig. 3. Is the Fork itself, in its true Size, to hold up the Tongue in that Operation.

Fig. 4. and 5. Are thin Plates of Gold or Silver to supply the Loss of any Part of the Palate-bones, having a Piece of soft Sponge fastened to them in the Part a a.

Fig. 6. Represents the brass Instrument of HILDANUS, to take off the Uvula by Ligature. AA is the Thread or Ligature properly disposed and fastened in the Instrument; B, the Part which takes hold of the Uvula; C, that Part of the String to be drawn by the Hand. But the Instrument itself is figured three Fingers Breadth less than it really is.

Fig. 7. Is a brass or steel Wire furnished with an Aperture A, to convey the String through the preceding Instrument, to the Size of which it should be proportioned. B, its Handle.

Fig. 8. Represents an Instrument to make an Abcission of the Uvula. A, the Part which is to receive the Uvula; BB, the Handle by which the Scalpel C is thrust forward to cut off the Uvula, DDD, is the Handle of the whole Instrument to be held in the left Hand.

Fig. 9. Is an Instrument that may be called *Paristhmiotomus*, serving to scarify the Tonsils when inflamed, or open them when suppurated. A, the concealed scarificator; B, the Handle by which it is to be moved in that Work; C, the Handle by which the Instrument is to be held firm in the Operation. This Instrument is figured two or three Fingers Breadth less than it really is.

Fig. 10. Is a Probang or long Probe of Whalebone marked BB, furnished with an oily Sponge AA, to remove small Bones or Splinters out of the Gula.

Fig. 11. Is a Scowering-brush for the Stomach. AA, the Brush-part of fine Hairs; BBB, the Handle of twisted Brass Wire, covered with Silk, by which it is to be introduced into the Stomach and drawn out again.

Fig. 12. Exhibits the wry Neck. AA, the two mastoide Muscles, which are to be divided in their lower Part, when preternaturally contracted.

Fig. 13. Represents an Instrument to straighten the wry Neck. A, the Collar lined with Fur, to be put about the Neck; BB, an Iron Arch furnished with the Ring C, by which the Patient is to be suspended.

Fig. 14. Exhibits the Part and Manner of dividing the Integuments in *Tracheotomy*.

Fig. 15. Represents a Kind of Trochar to perforate the *Aspera Arteria* in Bronchotomy.

Fig. 16. Is another of those Instruments contrived by DEKKER. AA, the Bodkin, whose Point coming through the Tube introduces it into the Trachea, where it is left after the Bodkin is extracted.

Fig. 17. Denotes the Part of the Neck for the transverse Seton.

Fig. 18. Is a Glass-instrument, whose Bowl A, being applied upon the Nipple, and the Tube BB in the Patient's Mouth, the Nipple and Milk may be drawn out.

Fig. 19. Is a little Cucurbite of Ivory or Alabaster to draw out small Nipples, and cover them when excoriated.

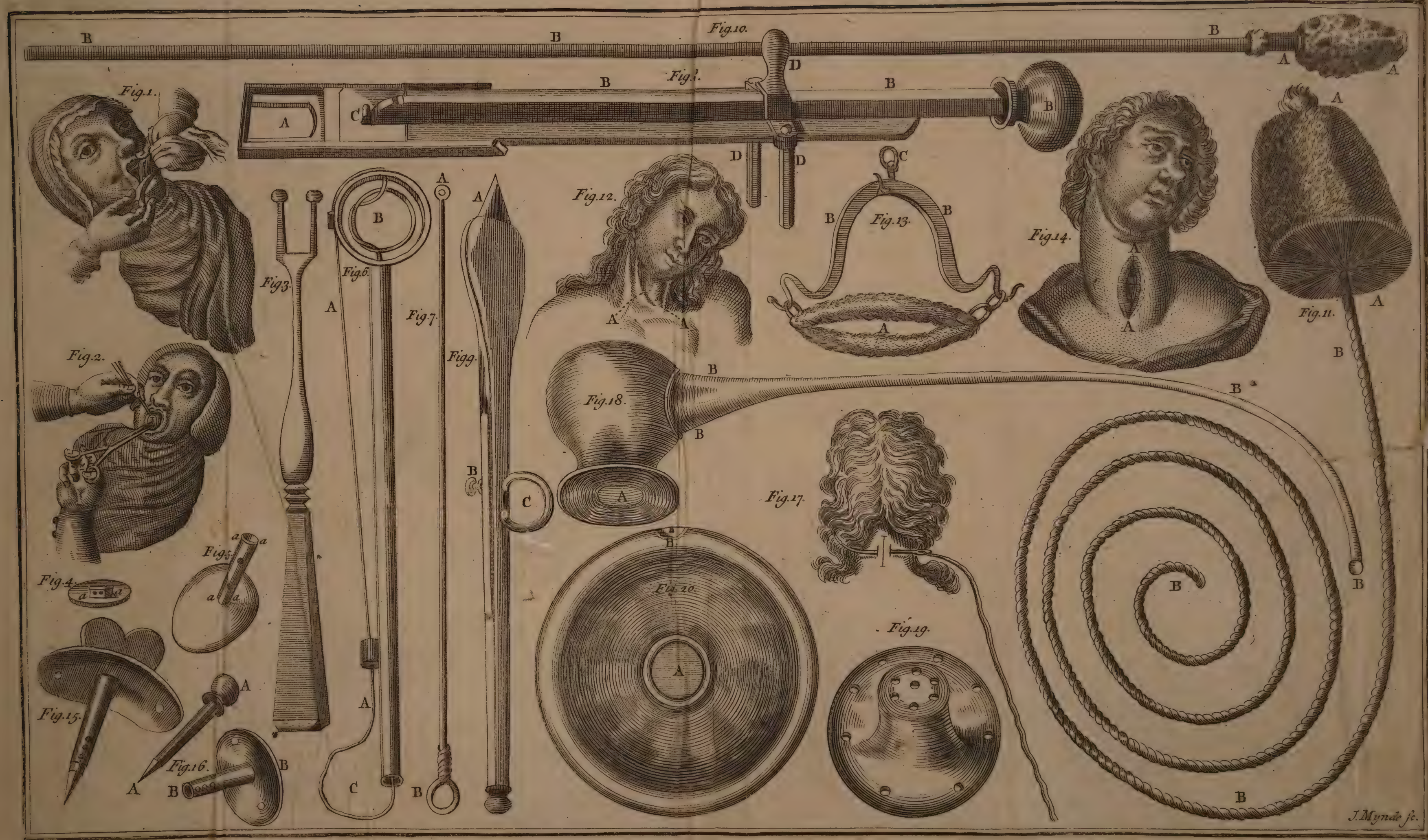
Fig. 20. Is a sucking Glass to draw out the Milk, by rarifying the internal Air with Heat.

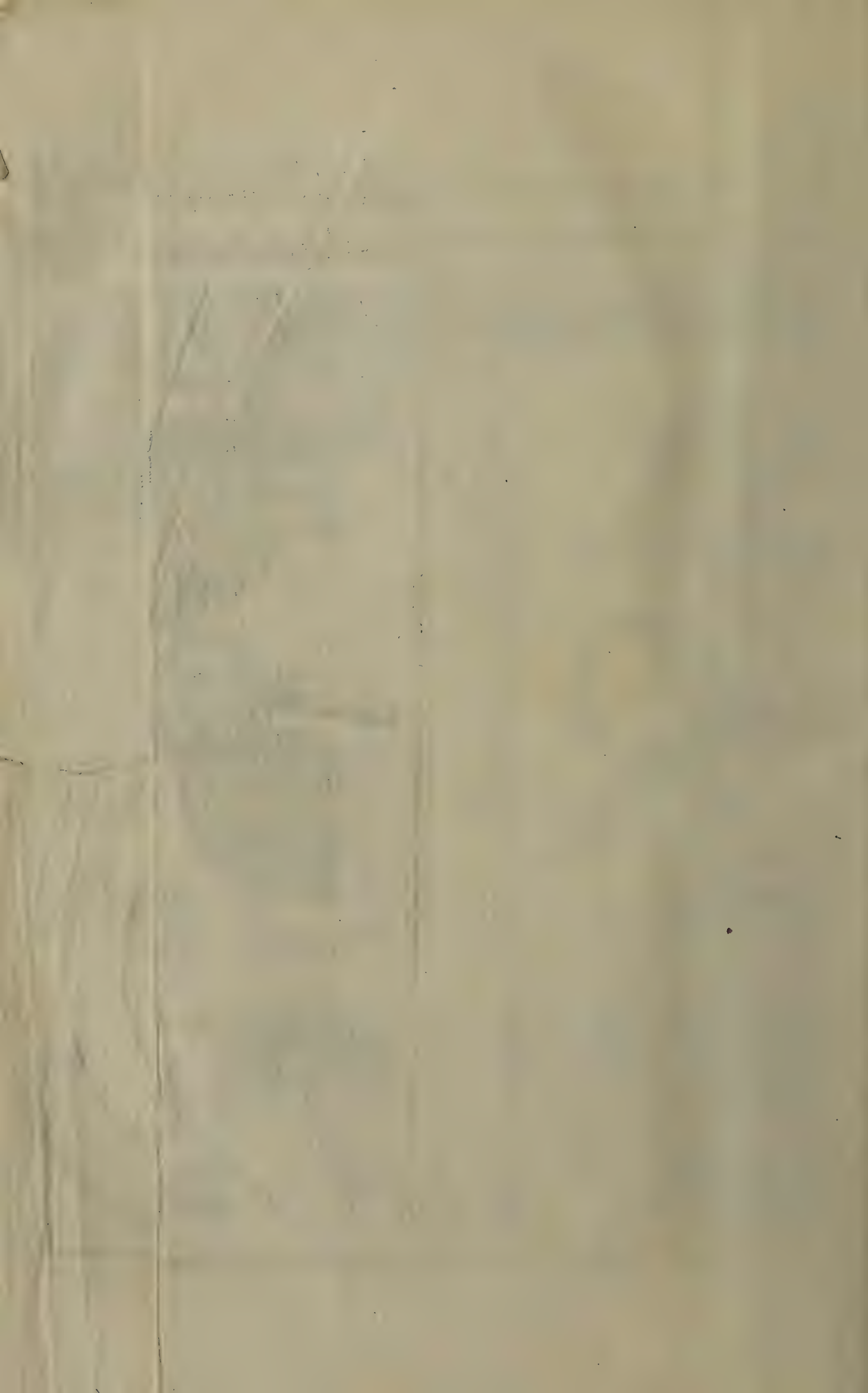
C H A P. CVII.

Of a Cancer in the BREASTS.

Design of
this Chap-
ter.

I. **W**E have before observed (in *Part I. Book IV. Chap. IV.*) that the Breasts, especially those of Women, are not only subject to Inflammation and Ulceration, but also to become scirrhus and cancerous. But how the first are to be treated, we have before declared in the Place now mentioned. We have also explained (in *Part I. Book IV. Chap. XVII.*) the Causes which may produce a Cancer, the Manner of its Increase, with its consequent Symptoms and diagnostic Signs, together with the Medicines proper through the whole Course





Course of the Disorder. It therefore now remains to describe the Operation, by which a cancerous Breast is to be extirpated, when other Medicines have no Effect. And I am well convinced by Experience, that Caustics properly applied will often extirpate these Cancers, especially of the smaller Size: but they will not always succeed.

II. Before we proceed to an Operation so important, it may be first necessary to enquire whether the adjacent axillary Glands are indurated only, or whether they are infected, and communicate with the Cancer. For in that Case, extirpating the Breast will not cure the Patient: but the Virus of the Cancer, which lies concealed in the other Parts, will make the same Disorder break out again in a short Time. Though there are some Instances, where the axillary Glands have been indurated, and the Patient cured of the Cancer by extirpating those Glands together with the Breast. Before the Surgeon proceeds to this Operation, he should first prepare his Patient for it by a proper Diet and Way of Living, that the Cancer may not be too large and immoveable. When he finds it in that Condition, occupying but one Part of the Breast, as in *Tab. XXII. Fig. 1. AB*, the Patient should then be placed in a high Chair, and the Arm belonging to the affected Breast should be either held downward and backward extended, or fastened to the Chair in that Posture with a Ligature; by which Means the pectoral Muscle will be flattened or expanded, and more easily separated from the disordered Part of the Breast. It is then the Practice of many, to make a large cruciform Incision upon the Integuments of the Cancer, which being carefully separated by the Scalpel, and the Cancer freed from the sound Parts on every Side, is then extracted, which may be done commodiously by passing a large Needle *Tab. VI. Fig. 5, 6.* with a Ligature: or the disordered Part may be elevated by a Hook only, represented in *Tab. VIII. Fig. 2, 3.* For my own Part, I have often extirpated Cancers bigger than one's Fist, which have extended from the Nipple to the Shoulder, in the Manner represented by *Tab. XXII. Fig. 1. AB*, which have been cut off, by no other Instrument than the Scalpel *Tab. XII. Fig. 14.* in a straight Direction. After an exact Separation of the morbid from the sound Parts, the Wound has been healed in the Manner exhibited by *Tab. XXII. Fig. 2.* but where the Integuments are also affected and strictly joined to the Cancer, there will be little room to expect a perfect Cure, if they are not both cleanly extirpated together.

III. Immediately after the Operation, it may be convenient to let the Wound bleed a few Ounces according to the Strength of the Patient, if they are not of a weak and infirm Habit, which may prevent a fresh Hæmorrhage, Inflammation, or Fever. Nor is it necessary to apply an actual Cautery to stop the Hæmorrhage in this Operation, as the Antients were of Opinion. It may be sufficient only to tie up the larger Vessels, and to apply a large Quantity of scraped Lint, retaining it with a thick and broad Compress and a long Bandage: though my quondam Preceptor BIDLOW, who was well versed in these Operations, advises to sprinkle fine Powder of Plaster of Paris upon the Lint to stop the Hæmorrhage. Others advised styptic Powders, or taking up the larger Arteries with a Needle and Thread. But GARENGEOT asserts, sowing up the Lips of the recent Wound immediately after the Operation, as he celebrated:

The Manner of extirpating a latent Cancer, not yet spread thro' the Breast.

What is to be done after the Operation.

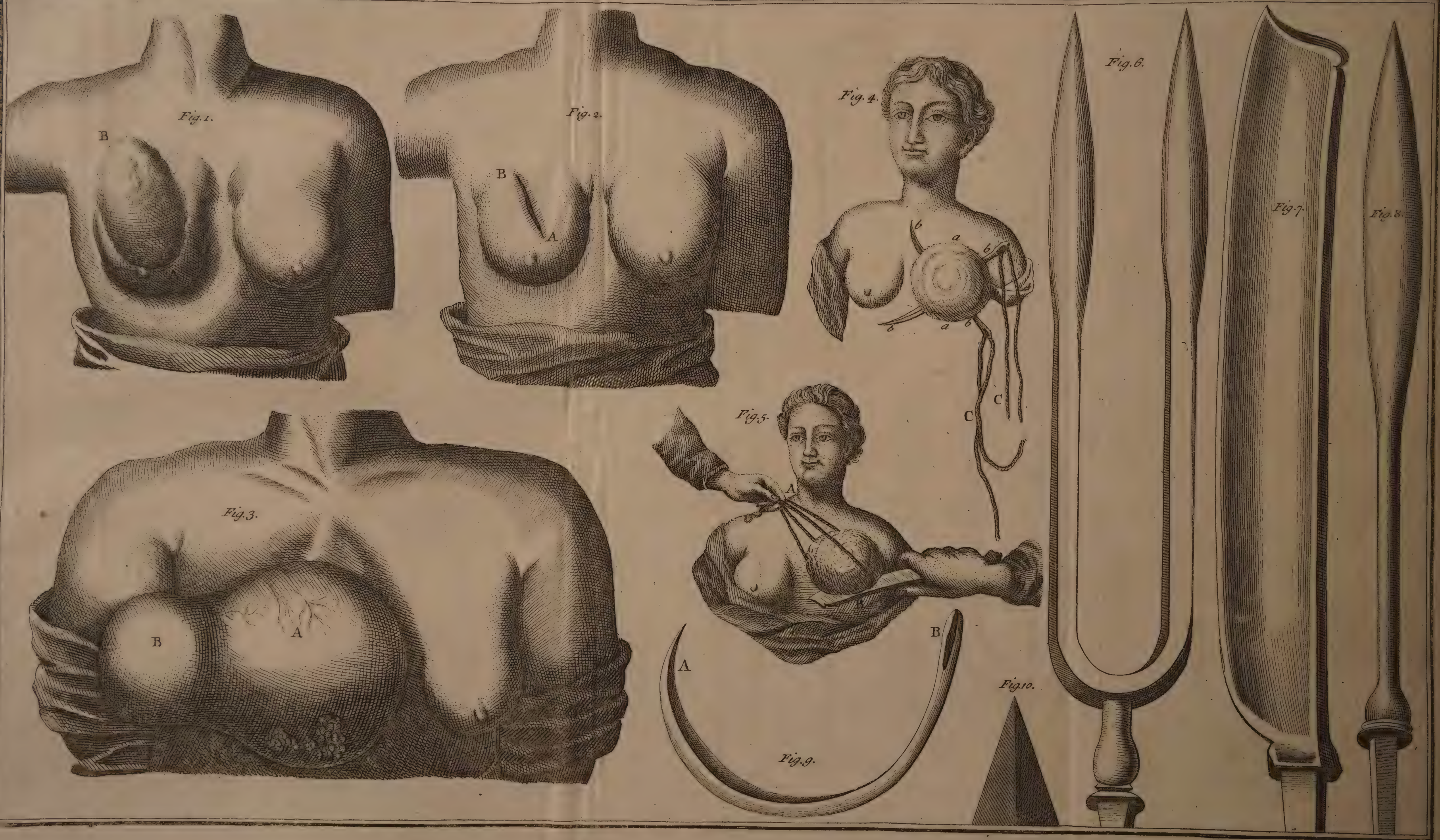
brated PETIT proposes, to be not only the safest Method of stopping the Hæmorrhage, but also the most expeditious Way of healing the Wound, and preventing a Return of the Cancer, without the Use of Lint, Styptics, or other Medicines. But a Cancer, which I extirpated in this Manner, which I let bleed a considerable Quantity after the Operation, was indeed soon healed: but then it returned soon after, and the Patient expired of a Cancer, which broke out several Times in the old Seat. I therefore think it very necessary to be provided not only with Lint, but also *Alcohol Vini* and styptic Powder of Bole, *Sang. Dracon. Colophon. & Massich.* to be applied with scraped Lint and Puff-ball, in such Cases, where the Hæmorrhage is violent, and especially when the Patient is weak and infirm; proceeding immediately to the Dressing without losing much Blood. The Remainder of the Treatment is to be managed at each Dressing, as we before have directed in treating of Wounds in general. I have sometimes experienced the Benefit of a large thick Compress dipt in warm Ale and Butter, to suppress the Inflammation in the first Dressing, as HELVETIUS advises: though other Cases have succeeded as well, in which all the Compresses were applied dry.

When the whole Breast is to be taken off in Cancers.

IV. If the whole Breast is become scirrhus or cancerous, whether it be latent and intire, or ulcerated, it ought to be extirpated with all the Parts of the Breast. And here the Surgeon should consider before the Operation, as we before advised, whether the Cancer has any Communication with the axillary Glands, or whether it adheres to the pectoral Muscle; in either of which Cases Authors generally assert the Operation to be useless. But some of these Cancers have been cured by extirpating those Glands, as we intimated before, at N^o II. to which we may add, that BIDLOW asserts, he has happily succeeded in such Cancers, where Part of the pectoral Muscle has been also affected and extirpated. He also affirms the Case to be not absolutely desperate, even if the Cancer has infected the Ribs with a Caries, which I have also experienced myself, more than once, having cured such a Caries with the Raspitory and *Ung. fusc. Wurtzii*. But if the Cancer has no Communication with the axillary Glands or pectoral Muscle, there is much more Hopes of succeeding in the Cure.

The Manner of operating.

V. When the whole Breast is therefore become cancerous, and to be totally extirpated, the principal Ways of performing the Operation are (1) by placing the Patient in a proper Seat; and, according to SCULTETUS, to pass a large Needle (*Tab. XVIII. Fig. 12.*) with a strong Thread or Cord, which is to be drawn through the Bottom of the cancerous Breast. The Extremities of the Cord or Ligature are to be afterwards fastened together, so as to elevate the Breast: and if one Ligature be not sufficient, a second may be introduced in a cross Direction to the former, as in *Tab. XXII. Fig. 4, 5.* by which Means the disordered Parts may be cleanly extirpated, by drawing them, in all Directions, towards the Knife, as well upward, represented in *Fig. 5.* as downward, according to SCULTETUS, *Tab. XXXVI.* The Knife used in the Operation should be larger or smaller, in Proportion to the Breast. The 2^d Way of performing the Operation, practised by SOLINGEN and BIDLOW, differs chiefly from the former in the Use of a large Fork (*Fig. 6.*) instead of the Ligatures, which is thrust into the Bottom of the cancerous Breast, that by making a strong Elevation, the Knife (*Fig. 7.*) may be passed beneath it. But if the Cancer be small,



small, BIDLOW uses a single Instrument (*Fig. 8.*) like a small Sword, to perform the Elevation instead of the Fork: each of which Instruments should be fitted with Handles. But (3) as these Methods of operating have been thought too formidable and severe by our modern Surgeons, HELVETIUS has endeavoured to effect the same, by contriving Pliers instead of a Fork: one of which (*Tab. XXIII. Fig. 1.*) holds up the disordered Breast by its two Points, AA; the other (*Fig. 2.*) squeezes up the whole Breast between its Sides, AB; by which Means it may be commodiously elevated, and evenly divided by a large Knife. The (4) and last, and in my Opinion, the best Way of operating, is, when the Surgeon uses no other Instrument but the Knife, whilst he elevates the disordered Breast with his other Hand: and if the Breast should be so much enlarged, that the Surgeon cannot contain it in one Hand, an Assistant may elevate it with both. By this Method I extirpated that large cancerous Breast (*Tab. XXII. Fig. 3.*) which weighed a dozen Pound, both expeditiously and successfully. See more Examples in SCULTETUS, *Obs.* 44.

An EXPLANATION of the TWENTY SECOND PLATE.

Fig. 1. AB, exhibits a latent or occult Cancer, occupying but Part of the Breast, from the Nipple towards the Shoulder.

Fig. 2. Represents the simple and rectilinear Cicatrix, left after the Cure of the former.

Fig. 3. AB, denotes a large Cancer, not yet broke, but spread through the whole Breast. It weighed 12 Pounds, after I had extirpated it with nothing but the Knife and my Hands.

Fig. 4. Shews the Method formerly practised to extirpate a Cancer by elevating with large Needles, bb, furnished with strong Threads, cc.

Fig. 5. Represents the Manner of fastening the preceding Threads, in the Hand A, to elevate and amputate the Cancer, with the long Knife, B.

Fig. 6. Is a Fork proposed by SOLINGEN and BIDLOW, to elevate the Breast in amputating Cancers.

Fig. 7. Is a large amputating Knife, for this Operation.

Fig. 8. Is the single Fork of BIDLOW, like a Sword, for elevating cancer'd Breasts.

Fig. 9. Is a large and broad crooked Needle; with a Groove near its Eye, B, to receive the Ligature. The Part B may be fastened in a Handle, that it may be more easily passed through the Breast.

Fig. 10. Represents the Point of the Needle in its true Size, viewed on the internal or concave Surface.

VI. The newest Method of performing this Operation, which was contrived a few Years ago by a Dutch Surgeon, but made public in a Dissertation, together with the Instrument (*Tab. XXIII. Fig. 3.*) by my Friend D. TABOR, a Physician, consists in placing the Breast between the two Arches of the Instrument *Fig. 3.* marked AA BB. These Arches are to be closed with the left Hand by the Handles CC. *Fig. 3.* in the Manner represented at *Fig. 4.* so as to elevate the cancerous Breast, which is afterwards to be cut off by a sharp Knife, in the Form of an Arch marked EF, fastened by the Screw G, and to be

A new Method of extirpating Cancers.

be moved over or across the other Arch DD. But though this is an ingenious Instrument, and worthy to be taken Notice of, we cannot help thinking that the simple Method of operating before described at N^o V. is much more preferable: yet we were unwilling to omit furnishing our Readers with this new Method and Instrument, which will be explained more at large in the References to *Tab. XXIII.* following.

What is to
be done after
the Opera-
tion.

VII. When the Breast has been taken off any of the aforementioned Ways, it may be proper to let it bleed a little before it is dressed; not so much to discharge the cancerous and infected Blood, as some imagine, as to prevent a future Hæmorrhage and Inflammation. This may however be omitted in case of Weakness; and then dressed as we have directed at N^o III. Only we are to observe this Admonition, that the Dressings are not to be taken off before the third Day: nor even then should any of the Lint be pulled off, till it falls off of its own Accord. And the seldomer or more tenderly the Dressings are made, the more kindly and speedily does it usually heal. But when there is a copious Discharge, the Dressing may be repeated the oftener, and made with dry Lint only, moistened with a little Tincture of Myrrh and Amber, instead of digestive Ointments, which will lessen the Discharge that generally weakens the Patient. * In the mean Time, the Patient is to be supported not only with good and easy Nourishment, as Broths, Gellies, Custard, &c. but also with mild Cordials and pleasant Emulsions. On the contrary, the Surgeon should be equally solicitous to avoid too great Dryness, which has been by some Authors observed as a Mark that the Disorder will return. In this Case it may be therefore proper to apply *Mel Rosarum* to promote a good Digestion of the Parts. When the Cancer has been by these Means cured; the Patient should ever after observe a regular Way of Life, avoiding Excesses of all Kinds, and observing to bleed and purge at proper Intervals, especially Spring and Fall. If a Fever, with Pain and Anguish about the Thorax, attended with a difficult Respiration, should succeed the Operation; it usually terminates in Death. To prevent which, the Patient should be bled, and treated as in other Fevers. It sometimes happens, that the Wound will not heal from a bad State of Blood: in this case we must palliate only, and treat it with gentle Balsamics, as the Essence of Amber or Myrrh; and when the Patients are necessitous, with Spirit of Wine only. Some Women sustain the Operation with surprizing Courage and Intrepidity of Mind, while others are equally pusillanimous and terrifying with their Clamours; to which the Surgeon should be deaf, according to the Advice of CELSUS, to succeed the better in his Operations.

An EXPLANATION of the TWENTY THIRD PLATE.

Fig. 1. Is the Pliers or Tenaculum of HELVETUS, serving to squeeze and hold up the cancerous Breast by its two Arches AA, while the Surgeon takes it off by cutting below them.

* In this Case the Use of *Alum. ust.* with a little *precip. rub.* has been recommended to me as very effectual, in speedily forming a firm Cicatrix.

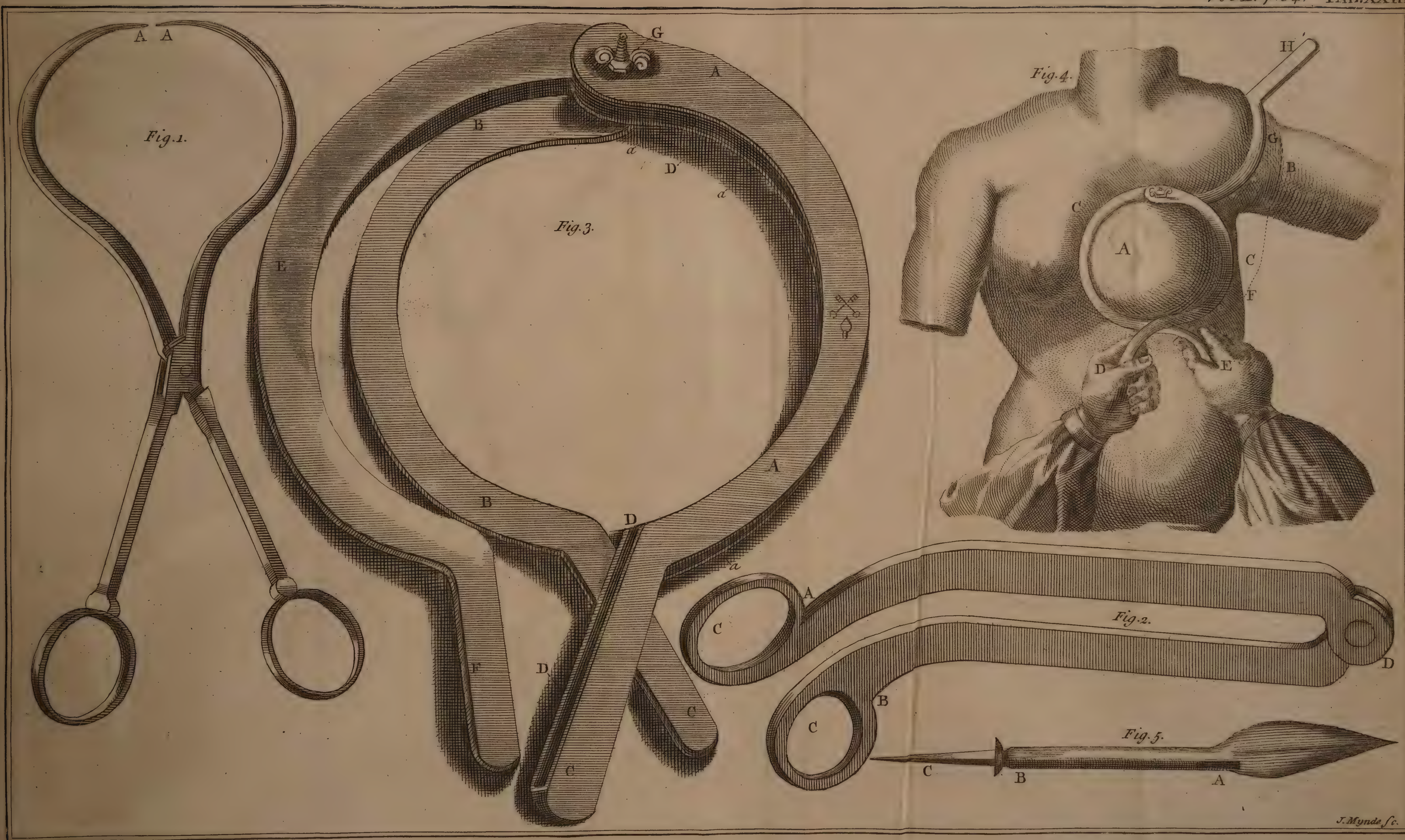


Fig. 2. Exhibits another steel Tenaculum, also invented by HELVETIUS, for the same Purpose. AB, its two Sides or Wings, cc, the Rings of its Handles for the Fingers; D, the Hinge by which it is opened and shut, to receive and compress the Breast.

Fig. 3. Represents a new Instrument for amputating cancered Breasts. AA, is a semi-circular and double Brass-plate, joined so as to leave a Space DDD between, to receive and direct the falciform Knife, EF aaa, the lowermost of these Plates. BB, is another semi-circular and single Brass-plate to act against the former, compress, and elevate the Breast. G, the Screw by which they are joined to form a compleat Circle to compress the Breast. CC, the two Handles of the semi-circular Plates. F, the Handle of the falciform Knife, which being transmitted through the Fissure, D, it moves across the Plates, AB, to amputate the Breast as in *Fig. 4.*

Fig. 4. Represents the left Breast of a Woman, cancerous, and going to be amputated. A, the cancerous Breast; B, the Arm extended; cc, the two semi-circular Plates, by which the Breast is compressed and elevated; D, the left Hand of the Surgeon holding the two Handles of the semi-circular Brass-plates; E, the right Hand, guiding the Handle of the falciform Knife, which is to be moved in the Direction, FGH, to divide the Breast.

Fig. 5. Is a kind of Needle for making the transverse Seton. A, the Eye of the Instrument through which the Ligature is to be drawn, and when it has passed through the Integuments to B, the Ligature is to be drawn out of the Eye, A, and left in the Wound while the Instrument is drawn back again. C, the Part of the Instrument which is to be fastened in a wooden Handle.

C H A P. CVIII.

Of the Paracentesis or Perforation of the THORAX.

I. **B**Y Paracentesis Physicians understand a Perforation of the Thorax, Abdomen, and sometimes the Scrotum, to discharge Water, Blood, Matter, or such other preternatural Substances as are there lodged. But the Paracentesis or Perforation of the Thorax, which we here consider, is usually made between the Ribs, in several Disorders, and particularly in the Empyema or Disorder in which a purulent Matter is contained in the Cavity of the Thorax, after an Inflammation and Suppuration of the Lungs and Pleura: which, if it be not timely discharged by this Operation, not only obstructs Respiration, but also returns into the Blood, by corroding the Lungs, Diaphragm, &c. and occasions a continual Hætic, with a Consumption of the whole Body, and other bad Symptoms. 2. This Operation may be necessary to discharge Blood, which has been extravasated into the Cavity of the Thorax, in Wounds of that Part by whose Orifice it cannot be discharged, but proves the Cause of many Disorders, which we before declared in *Part I. Book I. Chap. X. N^o 10.* This is by the *French* improperly called the Operation for the Empyema; since Matter is necessary to constitute that Disorder. It should therefore be called barely in this Case the Paracentesis of the Thorax. The Paracentesis is also necessary,

When the
Paracentesis
is necessary.

3. In a Dropsy of the Breast, by which the contained Water, fluctuating in this Cavity, and obstructing the Patient's Respiration by its Weight, may be discharged. But before we proceed to the Operation, it should be first considered whether the Patient's Strength will admit of it, or his Disorder be thereby relieved: for weak Patients often expire in or soon after the Operation. The same Event usually attends this Operation also, when the Disorder is become so inveterate, as to dissolve or suppurate the Viscera, and occasion a Fever, attended with Looseness, great Difficulty of Breathing, Faintings, or cold Sweats, which are the usual Forerunners of Death; and import, that this Operation will not be attended with its due Success. Therefore the Surgeon may hereby gain Reflexions, but no Credit. But if the Disorder be yet recent, and the Patient strong, he may then safely venture on the Paracentesis of the Thorax, which may be perforated without any Danger by a prudent Surgeon, who divides only the Skin, Fat, intercostal Muscles, and Pleura.

What part
of the Tho-
rax should
be perfo-
rated.

II. Two Things are necessary to be considered before the Operation: (1) in which Side of the Thorax the Matter is contained: and 2^{dly}, what Part of that Cavity is most proper to be perforated. In order to discover the first, the Surgeon should observe diligently, (1) In which Side the Patient has before had any Pain or Inflammation: (2) In what Part he perceives the Weight and Fluctuation of Matter: (3) On which Side he can lie easier than on the other, for that is usually the Side affected; the Person not being able to lie on the sound Side, because of the Weight or Pressure of the Matter on the Mediastinum. (4) And lastly, he may generally perceive some Tumor and inflammatory Heat in the Side affected. Having discovered which Side of the Thorax is to be perforated, the Operation may then be safely performed between the second and third of the spurious Ribs on the left Side^a, or between the third and fourth on the right Side, counting from below upwards, so as to be about five or six Fingers Breadth from the Spine of the Back, and as much below the Angle of the Scapula. For if the Thorax be perforated higher, the peccant Matter lodged in the Bottom of its Cavity will not be easily discharged: and if the Operation be made lower, there is Danger of wounding the Diaphragm, especially on the right Side, where it adheres higher up to the false Ribs, by reason of the subjacent Liver. Nor can the Perforation be easily and safely made near the Spine of the Back; because of the Thickness of the Integuments and Muscles, with the Danger of injuring the intercostal or other Vessels. The Place here assigned is therefore the most convenient and safe for the Paracentesis.

The Me-
thod of per-
forming the
Operation.

III. The Surgeon having marked the described Place with Ink, and taken up the Integuments between his own Fingers and those of an Assistant, as in cutting Issues; he then makes an Incision of about three Inches long, according to the Course of the Ribs, that he may afterwards more easily perforate the intercostal Muscles. The Part thus prepared is then perforated with the Trocar (*Tab. XXIV. Fig. 1.*) according to the Practice of some Surgeons: which being introduced into the Cavity of the Thorax, its triangular Bodkin (*Fig. 2.*) is extracted, and the Tube only left in the Wound, whereby the Humours are

^a BOERHAAVE (Aphor. 303.) tells us the Perforation should be made between the second and third of the lower *true* Ribs, which is contrary to the Opinion of all expert Surgeons; but he might possibly mean, *false* Ribs, which adjusts the Difference.

drawn off and discharged as long as the Patient's Strength will admit. When the Patient is perceived to be near fainting, or the Matter appears to be totally evacuated, the Cannula of the Trocar may be then suddenly removed, and a flexible Tube (*Tab. II. Fig. IX.*) of Silver or Lead (*Tab. II. Fig. 5.*) inserted in its Place, which may be fastened to the Thorax, with a Piece of Plaster and a Ligature. Over the Mouth of the Tube may be applied a Compress, retained by the Bandage called the Napkin and Scapulary. Sometimes the Trocar is introduced through the Integuments and intercostal Muscles by one push against its triangular Bodkin. But as the Lungs, which frequently adhere to the Pleura, may be by that Means injured, the following Method is always preferred by cautious and prudent Surgeons. Having prepared the Integuments by Incision as before, they then cautiously divide the intercostal Muscles, and Pleura by a transverse Incision with the Scalpel, G or H, *Tab. I.* and having introduced the Cannula as before, the contained Humours of the Thorax are thereby discharged. During the Operation the Patient should be retained in an inclined Posture, by which Means the Ribs will be elevated more from each other, and a larger Space made for the Incision. A sufficient Opening being made into the Thorax, the Finger is then to be introduced, in order to separate the Lungs from its Adhesions to the Pleura, and to make Way for the peccant Humours. Which last Method of performing the Paracentesis is certainly preferable to the former, notwithstanding it requires more Diligence in the Operator and Resolution in the Patient. For besides avoiding the Lungs, which would else be probably wounded, they may be separated by the Finger or Probe without Damage, and a larger and more perfect Discharge made of the offending Matter. And if we take the Advice of PETIT, we ought totally to abstain from the Use of Tubes or Tents in the Operation, as they are attended with ill Consequences; only stopping up the Orifice of the Wound with a Piece of soft Linen-rag convoluted or rolled up, whereby it may be kept open for future Discharges. But over the Obstacle of the Wound, is to be applied soft Lint, fastened to a Thread, and to be retained with Plaster, Compress, and Bandage.

IV. The Dressing may be afterwards made once or twice a Day, discharging and washing out the Matter, by injecting some deterging Liquor at each Dressing, which may be repeated according to the Patient's Strength. A Decoction for this Purpose may be made of vulnerary Herbs, as *Veronica*, *Scabiosa*, *Solidago Saracenicæ*, with *Mel Rosarum* and Oil of Myrrh; and if the Patient is not troubled with a Cough, a little Tincture of Myrrh, and WURTZ's pectoral Balsam. GARENGEOT frequently recommends a Decoction *ex Persicaria* and *Althea*, when the Disorder arises from a Pleurisy or Peripneumony: a Tincture of Sulphur of Antimony, made with Spirit of Wine, is also very efficacious in deterging and healing these Parts. Others extol a Mixture of *Aq. Calcis* with *Mel Rosarum*. These Injections should be continued till they are observed to return clean, and unmixed with bloody or purulent Matter, which is a Sign that the Parts are healed and become sound; whereupon the Tube or Lint may be withdrawn from the Perforation of the Thorax, and the rest of the Cure completed according to our Directions in Wounds of the Thorax. It may be however observed, that the Discharge of the injected Liquors may be much

Dressing after the Operation.

promoted by the Patient bending himself towards the Wound, and fetching a deep Inspiration. And during the whole Cure it may be equally advantageous to join internal Medicines, especially vulnerary Decoctions and Balsams, with a proper Regimen and Diet, in this, as in other Disorders. See a History of this Operation, performed in an Empyema, in SCULTETUS, *Obs.* 52. and in SAVIARD, *Obs.* 115.

Ulcers of
the Breast
running un-
der the In-
teguments.

V. It is to be here observed, that the Matter formed after Pleurifies and other Inflammations of these Parts does not always penetrate into the Cavity of the Thorax, but tends sometimes externally under the Integuments, so as to form an Abscess or Tumor. In this Case, the Surgeon is to open, not the Thorax, but the Tumor itself, which is the Seat of the Disorder, and appears externally, though it may be in Part contained in the Thorax as well as on its Surface. The Matter contained in these Abscesses is sometimes so acrimonious, as to corrode the Ribs and greatly spread the Disorder: in which Case, if the carious Parts of the Ribs cannot be removed, it is almost an Impossibility to effect a Cure^a.

C H A P. CIX.

Of trepanning the STERNUM.

AS Abscesses are sometimes formed under the Sternum between the Membranes^b of the Mediastinum from a Fall, Blow, Inflammation, or from other Causes; there is hardly a Possibility of discharging the Matter any other Way than by trepanning the Sternum. If the prudent Surgeon or Physician is therefore satisfied, that such an Abscess is formed in this Part, which is often no easy Matter to determine, the Operation should then be executed in the following Manner. First, the Patient is to be inclined backward, and a cruciform Incision made in the Integuments upon the lower Part of the Sternum, where the Abscess sometimes makes a Point. Then, the Integuments being freed from the Sternum, the Trepan is to be applied in the Manner we have directed, in perforating the Bones of the Cranium: and when an Aperture in the Sternum has been made by this Instrument, the Patient should then be inclined forward, and ordered to cough, or fetch a deep Inspiration, to promote the Discharge of the Matter. The Abscess may be then deterged and healed with Injections as before, and afterwards treated as in *Chap.* XLI. Some think trepanning the Sternum is an Operation not so dangerous as that of the Cranium: because in the latter, the Surgeon is more liable to wound the Brain, or its Meninges. But after all, it must be confessed that the Signs, by which we conjecture purulent Matter to be contained in this Part, are often uncertain and fallacious, which may occasion this Operation to be performed when there is no Necessity. HOFFMAN, and others tell us, that Humours contained under the Sternum, may be discharged by a

^a Of Fistulas in the Thorax. See SCULTETUS, *Obs.* 52. and DIONIS's Surgery.

^b Some deny that there is any Interstice between the Membranes of the Mediastinum; which may however be easily demonstrated: and though the Interstice is altogether inconsiderable in sound Bodies, it is often dilated into a very large Cavity by purulent Matter, as BLASIUS observes. *Obs. Anat.* P. 15.

Perforation in that Bone without any Danger. DIONIS also acquaints us that he has seen this Operation performed, but the Patient expired soon after. PETIT advises trepanning this Bone, when a violent Pain has continued there after a Fracture, notwithstanding it be set and united, for he thinks it a certain Sign of a latent Abscess in this Part: and he elsewhere asserts, that the contained Matter has sometimes corroded through the Sternum, discharging itself by a small Aperture. But as such an Ulcer cannot be sufficiently freed and cleansed from its Matter by so small an Aperture, it should be therefore enlarged, as we here propose, by the Trepan, and afterwards cleansed and healed as before. *Vide Lib. de Off. Cap. Carie & Exostosi.*

C H A P. CX.

Of the crooked or hump-back.

I. **G**ibbosity is a preternatural Incurvation of the *Spina Dorsi*, either backward or on one Side. Infants are observed to be more frequently the Subject of this Disorder than Adults; which proceeds oftner from external than internal Causes, as a great Fall, Blow, or the like; whereby the tender Bones of Infants are distorted or deformed. If it proceeds from an internal Cause, it is usually from a Relaxation of the Ligaments which sustain the Spine, or a Caries of its Vertebrae; though the Spine may be inflected forward, and the Back thrown out, by a too strong and repeated Action of the abdominal Muscles; which if not timely redressed, usually grows up, and fixes as the Bones harden, till in the Adult it becomes totally irretrievable. But when the Disorder is recent, and in a young Subject, there may be hopes of alleviating by Degrees, if not perfectly curing this Disorder.

Description
of this Dis-
order.

II. As a healthy Constitution depends greatly upon a regular Formation of the Thorax, that Part is usually assisted in this Disorder by a Machine made of Steel, Pasteboard, or Wood, which acts chiefly upon the gibbous Part; the Use of which should be continued by Infants and Children as they grow up, till the Deformity disappears. But we have a surgical Instrument purposely contrived for this Disorder, somewhat resembling a Cross, as in *Tab. XXIV. Fig. 5.* where AA are applied to the Shoulders and Back; BB, to the Neck; CC DD to the Shoulders and Arms; EE, being fastened by a Ligature to the Waist. By which Contrivance the Deformity may be prevented from growing worse, if it be not totally rectified; especially if the Part affected be frequently bathed with *Aq. Hungar. Spt. Lavend. &c.* and defended with a strengthening Plaster of *Opodeld. Nerven. Vigonis, Oxyroceum, &c.* at the same Time not neglecting the Use of proper Internals: all which may be of considerable Advantage, when the Disorder is not become inveterate.

Method of
Cure.

PART II. SECT. V.

Of Disorders in the ABDOMEN, appertaining to Surgery.

C H A P. CXI.

The Method of tying the Navel-string in new-born Infants.

How to
make a Li-
gature on
the Funicu-
lus Umbili-
calis.

I. **I**T is a Method universally received by all prudent Surgeons and Midwives, to make an exact Ligature upon the umbilical Cord of the new-born Infant; lest it should bleed to Death, by the Vessels which compose it. This Ligature is to be made, as soon as the Infant and After-burthen are delivered, with a strong Thread of about an Ell long, folded together four Times: and having made a Knot at one End, it is to be then passed twice round the Navel-string at about two or three Fingers breadth from the Abdomen, and afterwards tied with a double Knot. This done, the Cord leading to the Placenta may be divided with a Pair of Scissars below the Ligature, and the wounded Part belonging to the Infant dressed with Lint, after which it may be left to the Nurse, till it becomes dry and falls off of itself. I am not ignorant that it is the proper Business of a Midwife to perform this Office: but notwithstanding that, both the Surgeon and Physician ought to be acquainted with it: For if they should chance to be present at an unexpected Labour, and know nothing of this Affair, the Infant may be lost, by bleeding to Death, to the great Damage of their Reputation.

The Opera-
tion judged
unnecessary
by some.

II. There are some of the Moderns who think tying up the Navel-string to be useless and unnecessary^a, telling us of their having seen some Cases where it was omitted, without any consequent Danger; which I believe may sometimes happen. But there are many Instances well known to myself, and others, where the Infant has been lost by bleeding to Death, after dividing or lacerating the umbilical Cord, without tying it up: and therefore such are to be esteemed Whores, or people of bad Principles, who designedly omit the Ligature, and by that Means destroy the Infant, which, through the Quantity of Blood this way lost, seldom fails of deceasing in Convulsions, with other bad Symptoms.

C H A P. CXII.

The Manner of discharging the Water contained in the ABDOMEN, in the Dropsy Ascites by Paracentesis.

How the
Operation is
to be per-
formed.

I. **W**E have before mentioned the Paracentesis of the Thorax. It now remains for us to describe the Manner of perforating or tapping the Abdomen, in order to discharge the Water there contained in dropfical Subjects.

^a V. SCHULTZII Dissert. *An Funiculi umbilicalis Ligatura, in nuper natis absolute necessaria sit.* Hala, 1733. Where the Question is resolved in the Negative.

But is to be observed that Experience assures us the Operation will be useless in the Dropsy Tympanites, though its Success is confirmed in the Ascites, by many having been recovered from that Disorder by an accidental Paracentesis or Wound, by which the Water has discharged itself, and the Patient restored beyond Expectation. Instances of this we have given us by ROSSETUS^a. It is therefore with Reason that this Operation is encouraged in Dropsies^b by the skilful Physician and Surgeon. Though we must confess without Dissimulation that it gives but a temporary Relief to the Disorder, and that the Patient seldom escapes Death after it, not so much from the Operation as the Consumption and bad Habit of his Juices, with the infirm State of his Viscera. Yet we often find that in young and athletic or robust Patients, who have not been long subject to the Disorder, the Operation may be used with Success, and the Patient perfectly recovered. If no Benefit is therefore found from a proper Diet and Course of Physic, it will be necessary to proceed to the Operation without Delay, before the Strength of the Patient is too much exhausted, or his Viscera affected or vitiated by the morbid Lymph. But, on the contrary, when the Dropsy proceeds from a Scirrhus of some of the Viscera, and is attended with an internal Abscess and a Consumption of the whole Habit, the Surgeon can expect no Credit or Success from undertaking the Operation: neither can he expect it in those Dropsies which come upon the Patient, not by Degrees, but all at once, which is a Sign of some large lymphatic Vessels being burst. But for the Operation itself, it is neither dangerous nor very troublesome to the Patient, as the inflicted Wound is but small, and made in a fleshy Part.

II. That the Surgeon may be first well assured there is a Quantity of Water in the Abdomen, before he undertakes the Operation, he is to apply his two Hands on each Side the Patient's Belly, as he stands or sits, and to shake it from one Side to the other; by which Means he will perceive a Fluctuation of the Water from one Side to the other: which cannot be observed when the Lymph is not extravasated into the Cavity of the Abdomen. In the last Case the Operation is useless.

The Method of discovering Water in the Abdomen.

III. There are several different Methods used for performing the Paracentesis of the Abdomen, which we shall explain in order. The first and newest is by laying the Patient on the Side of his Bed, and inserting the Trocar (*Tab. XXIV. Fig. 1.*) into the Cavity of the Abdomen, at or about the Distance of eight Fingers breadth from the Navel, or in the Middle of the Space between the Navel and Angle of the *Os Ilium*: and after drawing out the sharp-pointed Bodkin *Fig. 2.* from the Cannula *Fig. 3.* which is left in the Wound, so much of the Water may be drawn off at a Time as the Patient can well bear. And if the Patient does not grow faint, the whole Quantity may be drawn off at once. In order to keep them from fainting, it is usual for the two Hands of the Surgeon or an Assistant to press on each Side of the Abdomen during the Operation: or the Swath made of broad Linen perforated in the Middle, as at *Fig. 8. Tab. V.* may be put round the Abdomen, and gradually drawn tighter, as we have directed in longitudinal Wounds of the Abdomen, till all the Water is evacuated. After this may be applied a flannel Compress to the Abdomen, which has been expressed

First Method of performing the Operation.

^a *De Partu Cæsarea*, Sect. III. Cap. III. pag. 44.

^b The Operation is therefore of Service only in the Ascites, never in the Anasæra, because in the last the Tumor is in the cellular Membrane.

out of *Sp. Vin.* to be retained by a tight Roller : by which Means, as I have frequently observed, the Patient not only avoids fainting, but rather becomes more easy and robust, so as to walk about after the Operation. But on the contrary, as HIPPOCRATES observes, if the Abdomen is not compressed, when there has been a large Discharge of Water all evacuated at the first opening, the Patient always faints, and often dies, either in or soon after the Operation. It is therefore the Advice of many Physicians to discharge but a few Pounds of Water at a Time according to the Strength of the Patient : after which the Cannula may be extracted, and as the Wound is but small, almost closing of itself, it may be dressed only with a Couple of square Compresses, Plaster, and Bandage ; repeating the Operation the next Day, in the other Side of the Abdomen, if the Patient's Abilities permit, and so on the third Day, about two Fingers breadth above the last Perforation. Fresh Wounds are made rather than to keep open the first, to prevent them from mortifying, to which they are very subject in hydropical Subjects. In the mean Time, the Patient should be assisted by a proper Diet, Regimen, and Course of Physic, till he either recovers, or by relapsing requires the Operation to be repeated. For, as CELSUS observes, the Discharge of the Water does not perform the Cure, but prepares the Way for the Application of Medicines, *L. 3. C. 26.* With regard to the Situation of the Patient in this Operation, he used formerly to be seated on a Chair or Bed. But many of our modern Surgeons after PETIT rather approve of laying him on one Side of the Bed : by which Means the Trocar may be more commodiously inserted into the lower and lateral Part of the Abdomen, the Water more perfectly discharged, and the Patient rendered not so subject to faint as in the perpendicular Posture. It is also the Advice and Practice of many modern Surgeons, to draw off the whole Quantity of Water at the first Tapping^a, and to repeat it upon a Return of the Disorder : but in weak Patients I should rather approve of the former, as the safest Method. For the Instrument used in the Operation, that is most approved of by PETIT, whose Cannula has a long Slit in it, as at *Tab. XXIV. Fig. 4. AA*, by which he thinks the Water may be more conveniently discharged than by the other. And lastly, that the Instrument may meet with a more easy Passage in thrusting it into the Abdomen, the End of it may be first dipt in Oil.

The 2d and
3d Way of
making the
Paracentesis.

IV. It was a Practice among the Ancients to insert a Knife, whose Point was about a third Part of an Inch broad into one Side of the Abdomen, about four Fingers breadth below the Navel, having usually perforated the Skin first with a Caustic. Then having introduced a Cannula of Lead, Copper, or Silver, they discharged so much of the Water at a Time as the Patient's Strength would permit. The Cannula for this Purpose was about the Length of two or three Fingers breadth (*Tab. II. Fig. QS*) being either crooked in its external Part, or furnished with a Rim, to prevent it from passing quite into the Abdomen : and when a sufficient Quantity of Water had been discharged by it, the Cannula was left in the Wound, and its Orifice stopped with a Cork or Dossil of Lint, over which was applied a sticking Plaster, Compress, and Bandage, with the

^a The Success of this Practice is instanced in *Act. Medic. Berolin. Tom. IX. Art. v.—Act. Acad. Reg. Paris 1703. Journal des Sçavans, ann. 1722. Mens. Julio.* DIONIS and GARENGEOT also assert, that extracting all the Water at the first Time weakens the Patient little or nothing, if a proper Pressure and Bandage be used.

Napkin and Scapulary. The next Day they repeated the Discharge again. But there is no doubt that the modern Practice is much more preferable; because by leaving the Cannula in the Wound it is almost impossible to avoid Inflammation, Mortification, or other bad Symptoms. To avoid these Inconveniences, BARBETT contrived a hollow Sort of Lancet or Silver Cannula, which had a Foramen on each Side, that it might serve as well to discharge the Water as perforate the Abdomen: but as the Intestines were in Danger of being injured, by the sharp Point of this Instrument, when the Water was near discharged, the Moderns more judiciously contrived and used the present Instrument, with the Cannula and sharp point Needle or Bodkin called a *Trocar*.

V. Though the Trocar is a sharp-pointed Instrument, yet there is no Danger of wounding the Intestines by it, when thrust into the Abdomen; because they are kept at a considerable Distance from the Instrument by the intervening Water. But was the Instrument to touch the Intestines, they would receive no great Injury, as they make but little Resistance. If the Cannula should be obstructed with any thing, the Obstacle may be removed by a Probe, and a free Passage thereby made for the Water. Sometimes the *Navel* and Parts adjacent are surprizingly distended in hydropical Subjects, in the Manner observed by HILDANUS, *Obs.* 47. *Cent.* 1. & *Purmannas Chirurgia Curiosa*, p. 330. in which Case it is proposed by some Surgeons to perforate the Navel; to which they are encouraged by reading of a Patient cured by a spontaneous Rupture of this Part, though it generally proves very troublesome; for, besides the Difficulty of discharging the Humours, the Wound made in this Part hardly ever heals. I cannot omit mentioning in this Place a remarkable Case, which I remember some-time ago in a dropical Woman at *Noremburg*. In whom, after I had tapped the left Side of the Abdomen in the Presence of several Physicians, who had also advised the Operation, a large Quantity of Water was discharged to the great Ease-ment of the Patient: but upon perforating the right Side on the next Day, no Water could be discharged. I therefore, with the Consent of the Physicians, again perforated the left Side, upon which we had another copious Discharge of Water: but the next Evening, notwithstanding the Abdomen was well secured with a Bandage, the Patient was seized with a violent Vomiting, without any manifest Cause; by which she was so much weakened, that it was judged useless to make any more Discharge of the Water. She expired a few Weeks after: but I was not permitted to search for the Cause of this uncommon Appearance in the deceased.

Some usual
Observations.

VI. Though tapping of dropical Patients does not frequently cure them of the Disorder, it at least eases them of the Oppression, Difficulty of Breathing, and other Symptoms, with which they are afflicted, insomuch that they cannot sleep, but are obliged to sit up both Day and Night, which renders this Operation absolutely necessary. Instances of this Operation being performed with Success, may be read in VOELTERI *Schola Obstetricia*, pag. 63. PECHLINI *Obs.* 62. NUCKEI *adenograph.* p. 122. BRUNNER in *Ephem. Nat. Cur.* Dec. 2. *An.* VIII. SINIBALDI *Methodo parva*; SAVIARDI *Obs.* 119. *Hist. Acad. Reg. Paris.* *An.* 1703. *Ubi multa à Verneo referuntur*; DIONIS *Chirurgia*; HELVETII *lib. de Sanguinis Profluviiis*, p. 79. *Act. Med. Berolinens.* Vol. IX. and X. not to mention the several Places before quoted in this Chapter.

Other Uses
of the Pa-
racentesis
in the Ab-
domen.

C H A P. CXIII.

Of the Cæsarean Section or Birth, being the Method of cutting the Fœtus out of the Womb.

The Nature
and Kinds
of this Ope-
ration.

I. **T**HE Cæsarean Section or Birth is a chirurgical Operation, by which the Fœtus is by a careful Section delivered from the Womb of its Mother, when it cannot be delivered in the natural Way. And this is performed either when the Fœtus and the Mother are both alive, or when one of them is already dead; to snatch one at least, if not both, from the very Jaws of Death. It is by the Greeks called *Hysterotomia*. There are many of the most eminent Physicians and Surgeons, who condemn this Operation as barbarous and mortal, such as PAREY, GUILLEMEAU, ROLFING, HORN, MAURICEAU, SOLINGEN, and others. But upon perusing the Writings of these Authors, I do not find they promiscuously condemn both Kinds of this Operation, but only the more dangerous one of cutting out the Child whilst its Mother is Living; which is certainly a fatal Operation. This they make appear by many Instances of the Operation being unhappily performed. There are chiefly three different Cases, in which this Operation is practicable; the first is, *when the Mother is dead*, either in the Birth, or by some Accident, *while the Fœtus is perceived*, or reasonably supposed to be yet surviving in the Womb. The second is, *when the Mother is living and the Fœtus dead*, but incapable of being expelled or extracted by the natural Passages, by any Assistance, either of the Midwife or Surgeon. The third and last Case is, *when the Mother and Fœtus are yet living*, but the latter is incapable of being brought into the World by the natural Passages: by which Means both of them are in the greatest Danger, if not relieved by this Operation. And though some deny that the Fœtus can survive the Death of its Mother, and assert that both de cease together^a; yet I have evidently proved the contrary, by many Instances, in a Treatise, intituled, *Fœtum ex utero matris mortuæ mature exscindendum esse*: To which may be added, the Authorities below^b, and many others.

First in the
dead Mo-
ther.

II. In the first Case, when the Mother is deceased, and the Fœtus reasonably supposed alive, there are few or no expert Surgeons, who disapprove of the Operation, without which the Fœtus would necessarily die, together with the Mother: and as Delay in this Case is dangerous, they universally agree, that the Operation should be performed, not only as soon as possible, but even before the

^a As Casp. BAUKIN in Lib. Anat. *Roderic à Castro de morb. mulier.* Lib. IV. Cap. 3. and among the Moderns the celebrated Mons. MERY in particular, in *Act. Acad. Reg. Scient. An.* 1708.

^b The Fœtus has been observed to move in the Mother's Belly the Day after her Decease by DOLEUS, *Encyclop. Chir.* Lib. IV. Cap. 5. ult. To which may be added TH. CORNELIUS, *Progymnasm.* 5. *de Generatione*, p. 207. VESLINGIUS's *Obs. & Epist.* 7. p. 48. TIMÆUS a Guldenkle, *Op. Med. p. m.* 1082. GEO. FRANCUS, in *Satyr. Mid.* IV. SCHELHAMMERUS in *Misc. Nat. Cur.* Dec. II. Ann. 5. *Obs.* 14. MAURICEAU's *Obs.* 315. & 593. ROONHUY'S *de Morb. Mulier.* ALBINUS's *Diff. de Partu difficili.* VIARDEL *traite des Accouchemens.* VATERUS in *Diff. de Partu Cæsareo ut & de Partu Hæminis post mortem Matris.* LA MOTTE, Lib. IV. Cap. 6. and Cap. 13. BRENDelius in *Obs. Anat.* VIII. Dec. II. SCHACHERUS in *Program. Lipsiæ*, 1731, edito *de Fœtu ex utero Mortuæ exscindendo, aliquæ.*

Circulation in the Mother is stopped, because the Fœtus cannot long survive. And in this Case we have many Instances of the Operation being performed, as well among the Ancients as Moderns: for example, ^a LYCA, ÆSCULAPIUS ^b, SCIPIO AFRICANUS, thence called CÆSAR, and MANLIUS ^c, an Officer at *Carthage*, and as some say the Emperor JULIUS CÆSAR. Among the Moderns we may reckon EDWARD the Sixth, King of *England*, and SANCTUS, King of *Navar*, and several others, which are taken Notice of by Authors, and called CÆSARS, from the Operation ^d. When the Surgeon therefore perceives the Mother to be in the Agonies of Death, he should be getting every thing ready for the Operation, that when she is deceased, he may have nothing more to do than open the Abdomen ^e by a cruciform Incision, as in common Dissections: or if he would proceed more cautiously, by making a longitudinal Incision on one Side with a Razor or Scalpel, without Respect to the Course of the Fibres in the Muscles or Vessels. And if the Fœtus should have fallen into the Cavity of the Abdomen ^f from a Rupture of the Uterus, or other Cause, it should be then taken out immediately: and as it is usually very weak, a little Wine, Hungary-water, or the like, should be held for it to smell at, or a little of the first given it to drink endeavouring to recover it by blowing into its Mouth and Nose, baptizing it immediately in cold Water, and tying up the Navel-string as we have before directed. But if it remains concealed in the Womb, it should then be cautiously opened, and the Fœtus extracted, the Navel-string tied and divided, and the Child recovered as before, which compleats the Operation. If the Fœtus should be concealed in the Ovary, or the Fallopian Tube, which is sometimes the Case, it should be also thence cautiously extracted. But the Surgeon should carefully distinguish whether the Mother be dead or only in a Deliquium, least he perform the Operation rashly, as we are told happened to VESALIUS. He should be rather well satisfied that the Mother is dead, from observing whether there be any Motion of the Heart, Arteries, and Lungs, and have the Consent of the By-standers, in his Opinion, before he enters the Knife: though I know not of any Instances of the Operation being performed when the Subject has been mistakenly supposed dead, but really alive. And

^a Vid. VIRGIL. *Æn.* X. Inde Lycam ferit, exemptum jam matre perempta.

^b Vid. OVID. *Metamorph.* L. II.

^c Vid. PLIN. *Nat. Hist.* L. VII. C. IX.

^d PURMANNUS (*in Chirurg. Curios.* Part II. Cap. 10.) took out a Male Fœtus alive from the Womb of its dead Mother by this Operation, which it afterwards survived. The like Case may be read in *Ephem. Nat. Cur.* Cent. III. Obs. 57. p. 136. CAROL. STEPHANUS, *Lib. III. Cap. 1.* HORAT. AUGENIUS, *Lib. IV. Epist. 2.* JO. SCHENCKIUS, *Obs. Lib. IV.* GUILLEMEAU, *Lib. de Art. Obs. loc. cit.* VOELTERUS, *Lib. de Art. Obs. Lib. II. Cap. 13.* MAURICEAU, *Obs.* 26, 251, 315, 353, 374, & 593. and JO. VALENT *Andrea Selenia Augustalia*, p. 361. relates the taking out two Male Twins alive, from the Uterus of their Mother, who had been shot dead, &c.

^e Some (as GUILLEMEAU and CAROL. STEPHAN) advise to keep open the Vagina by the Finger, and the Os Uteri Interni with a Stick till the Mother is deceased, that the Fœtus may have Air to breath: but as the Fœtus has no Respiration in the Womb, that Caution is both useless and unnecessary.

^f Which has been observed by STRAUSSIUS, BAYLIUS, SAVIARD, COURTIAL, BIANCHUS, CALYUS, ANELUS, *Lib. de fist. loc. Part II. Pag. 294.* Our Compend. of Anatomy, Note 35. *Miscel. Nat. Cur.* Dec. II. Ann. 5. Obs. 63. *Hist. Acad. Reg. Sc. Ann.* 1716. *Act. Acad. Nat. Cur.* Vol I. Obs. 176. Pag. 397. PISTOR, *de Fatu & rupto utero Abdomen prorumpente, aliique quamplurimi.*

even if the Case should be so, the Surgeon ought not to be much terrified thereat: because he is not committing Murder, but does it with a good Intent to preserve the Fœtus; to which he is obliged, as well by religious as national Laws. And in such a Case he may stitch up the Wounds again, and treat them according to our Directions in the first Part, and that possibly to good Effect, especially if the Opening was made barely by a longitudinal Incision on one Side. For if the Surgeon should delay too long through Timidity, the Fœtus may be lost, and his Operation performed in vain. Others condemn the Operation, because we are not certain the Fœtus is yet living, in which Case they never fail to be treated with Reflexions from the common People: but in my Opinion, admitting this to be true, it is better to open ten, nay, a hundred dead Women in vain, than to lose the Life of one Fœtus for want of the Operation.

That all Women dying before Delivery should undergo the Operation.

III. My general Advice is, that the Operation be performed as soon as possible upon all Women dying before, or in Delivery: partly, that the Fœtus may be taken out alive, baptized, and preserved from the Jaws of Death to Posterity; partly for the better Information of Physicians, Surgeons, and Midwives, to acquaint them with the Disposition, Structure, Situation, &c. of the Womb, in a gravid State, with that of the Fœtus and After-burthen, that they may the better assist others in the like Cases; and partly, as DEVENTER observes, to detect the Cause, whether the Midwife or Surgeon has, by their Ignorance and Mis-conduct, occasioned the Misfortune, that they may be better informed or duly punished. Much more might be said in Vindication of this Practice, to shew that it is agreeable with the ^a Roman Laws and Principles of Christianity; but more may be seen upon this Subject, in *Dissertatione Juridica de Jure Embryonum, Jenæ, Ann. 1716.* also NYMANNUS and WINCLERUS, *de vita Fœtus in utero*, GUILLEMEAU, PAREY, HILDANUS, MAURICEAU, DEVENTER, LA MOTTE, and MELLIUS on the Art of Midwifry.

The second Case, when the Fœtus is dead, and the Mother alive.

IV. The second Case, in which this Operation may be necessary, is, *when the Mother is living and the Fœtus dead*, without any Possibility of extracting it by the natural Passages: As when the Fœtus appears to be contained in the Fallopian Tube, Ovary, or Cavity of the Abdomen^b, of which we have various Instances in Authors; or when it is lodged in a kind of Hernia or Sacculus without the Abdomen, as SENNERTUS^c and HILDANUS^d have described: or if it be obstructed by a callous, scirrhus, or other Tumor, in the Vagina or *Os Tincæ*, which may render the Extraction of it impracticable; or when the natural Passages are not large enough, either from an irremediable Coalition, or Callosity of the Vagina^e; or from a bad Conformation of the Os Pubis, as

^a *Vid. Digest. Lib. 11. tit. 8.*

^b The Signs thereof are no Relaxation of the *Os Uteri*, nor discharge of the Waters after the Labour Pains have been felt, the Fœtus appears higher up in the Abdomen, and its Head, Arms, Legs, &c. may be more perfectly distinguished by feeling than usual. *Vide Welschii notam in Cap de Sect. Cæsarea. SCIPIO's Mercur. PISTOR's Dissert. de Fœtu rupto utero in Abdomen prodeunte. Diar. Erud. Paris. 1722. Mens. Junio. SAVIARD's Chirurg. Qbs. 65. DIONIS's Dissert. de Generatione. Our Compend. of Anatomy, Note 35.*

^c *Instit. Med. Lib. II. Part I. Cap. 9.*

^d *Epist. de Hernia Uterina.*

^e *Act. Erud. Lips. Ann. 1693. P. 229. VATERUS de Partu Cæsareo, Vitebergæ, Ann. 1695. where some-*

sometimes happens in crooked Women, by which Obstacles the Fœtus is rendered incapable of being delivered, while the Mother is spent and in danger of Death, by the violent Pains, Convulsions, Hæmorrhage, &c. In all which Cases I think the Operation is necessary to preserve the Mother and Fœtus, notwithstanding it has been condemned by many of the ancient as well as the modern Surgeons and Physicians. For in such Cases the Extraction or Excision of the Infant, so as to bring it through the natural Passages, which MAURICEAU prefers to the Cæsarean Section, cannot be performed. There is therefore but one Remedy left to preserve the Life of the Mother and Fœtus when she cannot be delivered: and that is the Cæsarean Section, or cutting the Fœtus out of the Abdomen or Uterus; the Success of which Practice is confirmed by various Instances. MAURICEAU therefore speaks contrary to Reason and Experience, when he pronounces this Operation always fatal to the Mother.

V. We are encouraged to the Operation by many, when the Mother is supposed to be deceased, and even when the Mother is alive, when Nature seems to point out for the Operation, by some painful Tumor or Abscess formed at the Navel, or in some other Part of the Abdomen: in which Case the Operation has succeeded by relation in many Instances; because the Hæmorrhage in that Case is usually small, and the Fœtus generally found in the Fallopian Tube, Ovary, or in the open Cavity of the Abdomen itself. But when the Fœtus is contained in the Womb of its Mother yet living, without any Appearance of an Abscess, in that Case the Operation is condemned by many eminent Physicians and Surgeons, as both cruel and fatal: but that they entertain such an erroneous Opinion contrary to Reason and Experience, is made evident by many of their own Profession as below^a.

The Operation rejected by some in particular Cases.

VI. It must indeed be confessed, that the Operation is both hazardous and dangerous to the Mother, especially when there is no Abscess formed, but the Fœtus must be cut of the Womb: and therefore it should never be undertaken but in Cases of the last Necessity. But that the Operation may sometimes be performed with Success, may be concluded both from the forequoted Authorities and those which follow. GOVEUS, ROSSETUS, MERCURIUS, WELSHIUS, and others, assert the Operation to be not only practicable with Success, in a skilful Hand, but also alledge many Instances of those who have recovered after the Operation, which they think to be no more dangerous than cutting for the Stone. But I cannot be of their Opinion, since there are many fatal Accounts of it given us by Writers; and especially as there is great Danger of losing the Patient from the great Hæmorrhage, or a Mortification following the Wound

The Difficulty and Necessity of performing the Operation considered.

he describes the Vagina to have been altogether callous, from a preceding Ulcer, and not large enough to admit a Pea. V. SAVIARD *Obs.* 114. MAURICEAU *Obs.* 26.

^a The Operation is encouraged by ROSSETUS, BAUHINUS *Lib. de Partu Cæsareo*. SENNERTUS in *instit. Medic. & praxi Medica*. HILDANUS *Epist. de Hernia Uterina, in oper.* Pag. 897. FIENUS in *libris Chirurg. Cap. VIII.* SCULTETUS *Armum. Chirurg. Tab. de Partu Cæsareo*. SCIPIO MERCURIUS *Lib. de Arte Obstetricandi. Cap. de Partu Cæsareo*. RONHUSIUS *Lib. II. Obs. Chirurg. 1. de morb. Mulier.* RULOVIVS *Lib. de Sect. Cæsar.* RANCKISCHIUS *Vib. Act. Erud. Lips. Ann. 1693. Pag. 229. & Misc. Nat. Cur. Dec. III. Ann. 2. Obs. 17. itemque.* VATERI *Diff. de Partu Cæsareo*. SAVIARDUS *Obs. Chirurg. Obs. 69.* JOBERTUS *Diar. Erud. Paris. Ann. 1692, and 1693.* LA MOTTE *de Art. Obstetric. Lib. IV. Cap. 12.* TEICHMEIRUS in *Instit. med. Forensis, Pag. 18.* and others, who assert the Operation to have been performed with Success, the Mother happily surviving.

in the Uterus ; as CELSUS observes, *Lib. 3. C. 56.* Therefore MAURICEAU, and others, justly advise rather to extract the Fœtus by Instruments through the natural Passages, if possible, rather than to execute this dangerous Operation. But when that is impracticable, as it frequently may be, from the Causes before mentioned, so that both Mother and Fœtus are in the utmost Danger, it would even be barbarous to neglect an Operation, which may possibly be the Means of saving them both, which must otherwise inevitably perish : for in such a Case it is better to try an uncertain Means than none at all, as HIPPOCRATES and CELSUS advise, rather than leave the Patient destitute to the Extremities of Torture and certain Death, when there is a Possibility of Relief from the Operation, to which we are encouraged by many Instances of its Success. Others think it better to leave the Event to Nature, when the Delivery is impracticable, than to expose the Patient to so hazardous and severe an Operation : for, say they, Nature often makes Way of herself, whereby the Fœtus may be discharged by an Abscess in the Abdomen at the Navel, Inguen, or Rectum. To this I readily assent, when the Patient is in no Danger of Death, by such Expectation : but when the Patient's Life may be in the utmost Danger by waiting for such an Event, I think the Operation should be entered on without Delay, especially when the Mother being desirous of Life, not only gives her Consent, but even anxiously sollicit it. And of this there have been many Instances. See SAVIARD *Obs. 60.* and HILDANUS, in his Letter *de Herniâ Uterinâ*. Others again are afraid of performing the Operation, lest it should injure their Character. An excuse intolerable, even in a moral, and much more a Christian Person, to be the Cause of the Death of two at once by their Neglect ! So that we think with LA MOTTE, when the Delivery is impracticable, that the Surgeon cannot acquit himself with a safe Conscience to his Patient, without trying the Operation as the last possible Means of Relief.

Apparatus
necessary for
the Opera-
tion.

VII. If the unhappy Patient therefore submits to the Operation, the Surgeon should well consider, whether she has Strength sufficient to go through it : for if she is quite faint and worn out with Agonies, if the Extremities are cold, and a cold Sweat is come on, there is great Danger of her expiring, either under or soon after the Operation. In this Case her Death may be unjustly imputed to the Surgeon by malevolent or ignorant People. But if she has Strength sufficient, and there are Hopes of saving one or both of them, he should by all Means attempt it. To perform the Operation, He should first have in Readiness his Apparatus of Instruments and Dressing ; such as the straight Incision Knife (*Tab. XXX. Fig. 3.*) or an Incision Knife, like those used in common Dissections, with another that is obtuse pointed, represented in *Tab. V*, with Scissars also, obtuse pointed, crooked Needles, and strong Thread, as we directed in *Gastrophia*, or stitching up of Wounds in the Abdomen, together with two or three Sponges, and some warm Wine in a Vessel ; not omitting the Dressing, consisting of scraped Lint, Plaster, Compress, and Bandage, suitable to the Operation, with Restoratives for the Patient in case of fainting, Volatiles for the Nose, and some Cordial to be given internally. All these being provided and rightly disposed, the Patient's Bladder should be emptied, lest by Distention it should be injured by the Knife, and the Patient then placed in the Middle of the Chamber upon the Bed, in such a Manner, that the Operator and his Assistants may

may each perform their proper Office. The Patient should then be encouraged with comfortable and enlivening Discourse, and her Face covered from seeing the Instruments which might strike a Terror. And lastly, four strong Persons, at least, are to be placed to hold the Arms and Legs, that the Patient may not move under the Operation.

VIII. The Surgeon should then stand on that Side of the Patient which seems most convenient, and make a longitudinal Incision on the Outside of the *Rectus* Muscle between the Navel and Angle of the *Os Ilium*, where the Paracentesis is usually made in dropfical Subjects. The Skin and Membrana Adiposa are to be divided for the Space of about eight or ten Fingers breadth, passing afterwards through the oblique and transverse Muscles, and then carefully through the Peritoneum, in which a small Puncture should be first made, and further divided by an Incision Knife that has an obtuse Point (*Tab. V.*) or a Pair of Scissors; or in Defect of these, the Surgeon may introduce his Finger, and thereby defend and direct the first Incision Knife, till the Opening appears large enough to extract the Fœtus. This done, the Surgeon is to search where the Fœtus is lodged: and if it be withoutside the Uterus, in the Cavity of the Abdomen, as it has been sometimes found, it should be immediately extracted, together with its After-burthen, without further Delay. But if the Fœtus be contained in the Fallopian Tube, or in the Ovary, those Parts are to be opened, and the Fœtus with its Placenta then removed. If the Fœtus appears to be concealed in the Uterus, the Case is much more dangerous, because of the great Hæmorrhage and Injury received by that Organ, the wounding of which has been observed from the most ancient Times to be extremely dangerous^a, especially in Women with Child. But there is no other Way of taking out the Child; this is also to be opened by a longitudinal Incision sufficient to give a Passage to the Fœtus and its Appendages. When the Fœtus and After-burthen have been this Way removed, the extravasated Blood is to be discharged with Sponges that have been expressed out of warm Wine: and if the Flux be great, it should be lessened with Lint dipt in highly rectified Spirit of Wine, to be applied to the divided Orifices of the uterine Vessels, and there compressed by the Fingers till the Hæmorrhage ceases, or is much abated. The Surgeon should not be terrified at the considerable Loss of Blood in this Operation, if the Patient be of a strong Habit, because it is often usual for them to have a violent Hæmorrhage in the natural Way of Delivery. After a short Interval, to give the Patient Time to recover her Spirits, the Lint is to be taken out of the Wound and the Abdomen cleansed with Sponges. The wounded Parts are not to be sowed together, but dressed with *Bals. Capiv.* or the like, and left to Nature: for as the Uterus naturally contracts itself after Delivery, the wounded Parts will probably unite together^b.

Method of
performing
the Opera-
tion.

IX. The Wound in the Abdomen is to be joined together by two or three Sutures, as we directed before in *Gastroraphia*, leaving a little Space open at the Bottom for inserting a Cannula or Tent to discharge the Matter and other Humours from the Cavity of the Abdomen, which should be cleansed by repeated

Dressing af-
ter the Opera-
tion.

^a V. CELSUS, *Lib. V. Cap. 56.* and BOHNIUS *de vuln. Lethalibus.*

^b Vid. BARTHOLIN, *Cent. 6. Obs. 92.* ROONHUYX, *Obs. Chir. Lib. II. Pag. 21.* SÖLTINGEN *Chirurg. Pag. 776.* VANDER WIEL, *Pag. 2. Obs. 3.* MAURICEAU, *Obs. 251. Obs. Nostra in Act. Acad. Natur. Curios. Vol. 1. Obs. 176.*

Injectiōns of some vulnerary Decoction: and thus it should be continued, till more Matter is discharged, which is a Sign that the internal Wound is healed. Then the Threads of the Suture in the external Wound may be divided and extracted that it may be cicatrized. Authors generally advise the Patient to lie on her Back after the Operation: but if the Incision be made laterally, I think it better for the Patient to lie on her wounded Side, as we directed in Wounds of the Abdomen, by which Means the Matter may be discharged by Degrees, as it is made. ROSSETUS advises a cannulated Pessary to be inserted in the *Os Uteri*, to facilitate the Discharge of the Blood and Matter. In the mean Time, a proper Diet and Regimen with internal Medicines should be prescribed to the Patient by some prudent Physician, till the Patient recovers, which in the Case of LANCISCIUS was six Weeks, and the Wound easier healed. From what has been said, you will easily perceive that the Operation is attended with great Danger, especially where a large Incision is to be made in the Womb. But as there are many Instances of Patients preserved by this Practice, who, in all Probability, must otherwise have soon expired; and as we know no other Method to relieve them in this Extremity; it is much better, in my Opinion, to try a dangerous Remedy, than to give them up at once to the most miserable Tortures, and to certain Death.

Extraction
of the Fœtus
from an Abs-
cess.

X. A different Method is to be taken when the Fœtus endeavours to make its Exit, not by the natural Passages, but by some Abscess or Tumor in the Abdomen, and particularly in the umbilical Region, which has been frequently observed by Authors, and particularly by ROSSETUS, BAUHNUS, HILDANUS, and CYPRIANUS, and in *Annal. Acad. Julæ*, 1727, where a Tumor or Abscess was formed in the Rectus Muscle a little below the Navel, by which all the Parts of the putrid Fœtus, whose Bones I now keep by me, were extracted, and the Mother saved. In Cases of this Kind, I think it most adviseable to open the prominent Parts of the Tumor pointed out by Nature, under which the putrid Fœtus and Matter tormenting the Patient is usually concealed; which being removed, the Ulcer may be cleansed and healed as before. And if the Tumor has no apparent Suppuration, but the Patient is tormented with violent Pain in the Part, and the Tumor appears to contain something preternatural, after weighing the Circumstances of the Case in Consultation with others, it should be opened without Delay, the Bones of the Fœtus, or other corrupted Matter, should be extracted, and the Wound cleansed and healed without Suture as in other Abscesses.

When the
Fœtus is
contained in
a Hernia, or
makes its
Exit by the
Anus.

XI. When the Fœtus is lodged in a Kind of Sacculus or uterine Hernia, according to the Observation of SENNERTUS and HILDANUS, which but seldom occurs; an Incision is to be made through the common Integuments, and afterwards through the dilated Uterus and including Membranes of the Fœtus, which should be then extracted, and the Remainder of the Treatment managed as before. In the Case of SENNERTUS and HILDANUS, the Surgeon did not return the Uterus, but immediately sowed up the Wound: so that I imagine the Uterus being incapable of a Reduction afterwards, was the Cause of the Mother's Death, when the Operation had been performed the Space of four Weeks, notwithstanding the Fœtus continued alive and well. He would probably have succeeded better, if he had returned the Uterus a few Days after when it was contracted in a less Compass without making any Suture. If the

Fœtus

Fœtus should take its Course towards the Anus, the Bones making an Abscess and Passage into the Rectum ^a should be carefully extracted with the Fingers or Forceps, and the Ulcer then deterged and healed by the Use of Injections and Balsams.

XII. The third and last Case, in which the Cæsarean Section may be used, is when *the Mother and Fœtus are both living* ^b but no Possibility of a Delivery any other Way, from some of the Causes mentioned at N^o 4. especially a bad Conformation of the Parts in the Mother, preventing the Surgeon from introducing his Hand ^c. In this Case the Operation is also esteemed barbarous and inhumane by the Generality of common People, and even some of the Profession, who are prejudiced with a mistaken Hypothesis, by which they had rather lose both Mother and Child by their Neglect, than save perhaps both of them by this Operation; which may be of especial Consequence in regal Families, where Peace and War, or the Devastation and Prosperity of whole Nations and Cities may depend on the Progeny. We therefore cannot help thinking it contrary to the Principles of Religion and a good Conscience, for the Surgeon to designedly neglect the Operation, when all other Means can have no Effect; according to the old Maxim, *quem non servasti, dum potuisti, illum occidisti*. To neglect saving a Person when it is in our Power, is to be accessary to his Death. Of two Evils the least is to be chose. Even MAURICEAU himself, a most ingenious and expert Manmidwife, though he generally inveighs against this Operation, could not help relating an Instance, where, after the Operation (performed by another Surgeon) the Mother indeed died, but the Fœtus was happily preserved: whereas without it they must both have been lost. But in truth it appears from several Passages in the Writings of MAURICEAU, PEU, and LA MOTTE, that they were over-ruled by the Opinions of some Divines of the Church of Rome, who maintain, that both the Mother and the Fœtus had better be lost, than that one should be saved by the Death of the other: and that indeed these Gentlemen, for fear of Persecution, contradicted their own Consciences. They were inwardly persuaded and convicted, that it is a much more humane and more Christian Doctrine, that one at least should be saved, where both cannot survive. But for the Operation itself, it is to be performed in the same Manner, as directed in N^o 4. to 8. only more Caution should be used for fear of wounding the living Fœtus. To revive the Fœtus which is almost spent in the Operation, it may be proper to fill its Mouth with Wine, or inflate the Fume of it up its Nose, bathing its Nose with *Aq. Hung.* and washing it with warm Wine: and after tying up the Navel-string, and baptizing it, the rest may be managed as we have directed in N^o 2.

Third Case
in which
the Opera-
tion is to be
used.

^a A large Quantity of Hair of a surprising Length, and variously contorted together, has been very often found in the Fallopian Tube, some Specimens of which I now keep by me; but as to the Cause and Manner of their Production, we are entirely in the Dark.

^b In this Case, the Operation was first performed in *Helvetia*, Ann. 1500, as we are told by BAUHINUS in *Præf. de Fœtu exsect.*

^c LA MOTTE will allow of the Cæsarean Section only in this Case, and on Condition that the Fœtus is living: Whereas, on the contrary, the general Advice is to perform the Operation, when the Fœtus may be reasonably supposed to be contained in the Ovary, Fallopian Tube, a kind of Hernia, or in the Cavity of the Abdomen, notwithstanding it may be dead.

Cautions.

XIII. Though I stand up for the Operation in Cases of the last Necessity, yet I am far from advising it, when there is a Possibility by any Means of avoiding so dangerous an Enterprize, by extracting the Fœtus through its natural Passages, though it could be done by no other Method than lessening it or pulling it to Pieces: nor did I ever perform the Operation but when the Mother was dead. It is certainly better to preserve the Mother, as a Tree, and destroy the Fœtus, as an irregular Branch, when its natural Birth is prevented from a bad Situation, too large a Size of Body, and particularly its Head, or from a monstrous Conformation of its Parts, rather than hazard the Life of the Mother in so dangerous an Operation, to preserve the Fœtus. I had also rather with SOLINGEN and LA MORTE, when the Birth is prevented by a Callosity of the *Vagina*, or something amiss in the Mouth of the Uterus, prefer a Division and Dilatation of those Parts to the Cæsarean Section, as much less dangerous. The same may be also said, when the *Vagina* is obstructed by the *Hymen*, or some other preternatural Membrane. But when the Callosity of the *Vagina* is so large and hard as to render the Birth that way impracticable, if it was to be divided, and especially where the *Vagina* is straitened and contracted by a bad Conformation of the Bones of the Pelvis, there is then no other Means left but the Cæsarean Section.

When the
Fœtus bursts
out of the
Uterus into
the Abdomen.

XIV. If a Rupture of the Uterus should be made in the Agonies of Labour, so as to let out the Fœtus into the Cavity of the Abdomen, the Possibility of which Case sometimes happening is confirmed by many Observations^a, in that Case the Cæsarean Section may also be absolutely necessary: for there is no other Way of Delivery left, and without it both Mother and Fœtus must inevitably perish in a short Time. That the Fœtus is thus burst out of the Uterus, may be known partly from the Violence of the preceding Agonies, and straining, to no Effect; the Pain afterwards ceasing or remitting, and the Mouth of the Uterus being not at all or but little relaxed: as also from the Situation of the Fœtus and the Perception of the Mother, succeeded by trembling and a great Tumor higher up in the Abdomen than usual. It may be further confirmed by feeling, and the Appearance of great Pain in the right or left Hypochondrium, attended with fainting, raving, and convulsive Motions in the Mother. When these Signs appear, and the Fœtus does not appear to resist as usual against the Finger introduced in the *Os Uteri*, it may be reasonably supposed to have burst into the Cavity of the Abdomen. In this Case it will be necessary to make an Incision in that Part of the Abdomen made most prominent by the Fœtus, which should be then extracted, cherished, and baptized, as before. But when the Arm of the Fœtus hangs out of the ruptured Uterus, it is then extremely difficult, if not impossible, to be assured of the Case by more than Conjecture from some of the forementioned Signs. It is in my Opinion inexcusable that the Operation should be neglected, when this Case has been sufficiently

^a Vide BARTHOLIN, Cent. VI. Obs. 92. ROSSETUS, Sect. IV. Cap. IV. SCHENCKIUS, Obs. Lib. IV. HILDANUS, Cent. I. Obs. 64. and 67. and Cent. IV. Obs. 57. ROONHUYLS, Obs. Chirurg. Lib. II. Obs. 1. SOLINGEN, Pag. 776. VANDER WIEL, Part II. Obs. 30. Miscel. Nat. Cur. Dec. II. Ann. 7. Obs. 10. and Ann. 9. Obs. 115. SALMUTH, Cent. I. Obs. 60. MAURICEAU, Obs. 251. Diar. Erud. Paris. Ann. 1722. Mens. Junio. LOESCHER, Diss. de Homine, Obs. 12. Act. Natur. Curios. Vol. I. Obs. 176. PISTOR, de Fœtu e rupto utero in Abdomen prorumpente 4^o Argent. 1726.

apparent, of which we have several Instances wherein both Mother and Fœtus have been lost. The Operation is also necessary, when the Fœtus is generated not in the Uterus but in the Cavity of the Abdomen, which may be discovered from the Signs of Gravitation having preceded, the higher Situation of the Fœtus and Stricture of the *Os Uteri* at the Time of Delivery, with the other Symptoms beforementioned. But the Uterus is sometimes ruptured in difficult Labour, so as not to exclude the whole Fœtus, but some Part only into the Cavity of the Abdomen: even a Leg may hang out of the *Os Uteri*, while the Head and Arms are excluded through the ruptured Uterus into the Abdomen. In that Case the Cæsarean Section is not necessary. I myself once found the Arm of a Fœtus hanging out of the *Os Uteri*, while its Head was lodged in the Abdomen through the Rupture, and the rest of its Body contained in the Uterus. ALBINUS and LA MOTTE have also observed the Head of the Fœtus rightly disposed to the *Os Uteri* and *Vagina*, while its Legs and Feet had perforated the Uterus into the Abdomen near the Diaphragm. The Fœtus in these Cases was extracted through the natural Passages by LA MOTTE, but the Mother died a few Days after. On the contrary, I have an Instance given me by RUNGIUS, where the Intestines of the Mother were plainly perceived by his Hand to fall down through the Rupture of the Uterus after the Child had been extracted: he pressed them back for some Time with his Hand from falling into the Uterus, till the latter had in some Measure contracted itself; and the Patient happily survived the Accident.

XV. The Difference between *Hysterotomy* and *Embryulcia*, or the Extraction of the Fœtus, (falsely called Exsection) ought to be here considered, because they are frequently confounded, even by some of the Learned, and mistaken for one and the same Thing. *Embryulcia* is the Extraction of the Fœtus by the natural Passages without any Incision, either in the Uterus or Abdomen; both which are divided in *Hysterotomy*, or Exsection of the Fœtus by the Cæsarean Operation. If we admit this Abuse of the Terms, what SCIPIO MERCURIUS tells us may be in some Measure true, that the Exsection of the Fœtus was in his Time as common in *France* as bleeding for the Head-ach was in *Italy*. By such a mistaken Way of Speaking, even among knowing People, Women are intimidated and afraid to call in the Assistance of a Surgeon in difficult Births, for fear the Child is to be cut out of the Belly: whereas the Fœtus is generally extracted in those Cases, by nothing more than the Hands, and at most without any Pain by Instruments, through the natural Passages.

The Difference between *Hysterotomy* and *Embryulcia*.

XVI. As a monstrous Fœtus, which consists of two Bodies, two Heads, &c. cannot be delivered from the Mother entire by the natural Passages, it may be asked whether the Cæsarean Section should be made for it, to the Hazard of the Mother's Life, or whether the Fœtus may be lessened, and so extracted in Pieces. ROONHUYNS is for the Operation; but for my own Part I must consent with the universal Opinion, that it is better to destroy the monstrous Birth than hazard the Mother's Life, and possibly destroy both. MELLIUS, a late Writer in *Italy* on the Art of Midwifry, condemns the Cæsarean Section, while the Mother is living. He asks this question: whether the Mother should be exposed to Danger for the sake of a Monster? Certainly not. So far I quite agree with him. But he is not aware that there are other Cases, beside that of a

Whether the Cæsarean Section should be made for a Fœtus when monstrous.

Whether
the Opera-
tion may be
practised
when the
Head of the
Fœtus will
not pass
through the
Vagina.

monstrous Fœtus, which require this Section; and where I think I have proved that the Operation, however dangerous, ought not to be omitted by the Surgeon.

XVII. It may be again asked, whether the Cæsarean Section may be performed when the Head of the Fœtus is so large, and the natural Passages so strait, that the Head is wedged in the internal *Os Uteri* or *Vagina*, so that it will neither move one Way nor another, the Fœtus usually dying within three Days, which is deservedly reckoned the most difficult Case in Midwifry, as both Mother and Fœtus are in Danger of speedy Death. Therefore, as the Head of the Fœtus cannot be held from its Slipperiness and Narrowness of the Passages, and as the Hand cannot be introduced ^a to alter its Position in the Uterus, and as no Instrument can lay hold of the Head to extract the Fœtus without killing it; the Question is on these Accounts started, whether the Cæsarean Section may be made to preserve the Fœtus? It is the Opinion of most, that neither the Cæsarean Section nor lessening of the Fœtus should be made while either of them are living: but they had rather, according to the Opinion of the Roman Church, that both should perish, than that one should survive at the Expence of the other's Life. They also equally condemn the Cæsarean Section, notwithstanding the many Instances of both surviving the Operation. We are told by ROONHUYNS it was performed seven Times by D. SONNIUS, Physician at *Bruges*, upon his own Wife, with Success both to the Infant as well as the Mother. The celebrated OLAUS RUDBECK is also said to have performed the Operation with Success upon his own Wife, the Fœtus also surviving. They will not therefore allow of extracting the Fœtus by Instruments ^b, because that hazards the Life of the Fœtus as much as the Cæsarean Section does the Life of the Mother.

XVIII. But though some vainglorious Men may assert that they can always extract the Fœtus, by their Hands only; I dare maintain that it is often impossible: and yet if proper Aids be not timely applied, before the Mother's Strength is quite exhausted, there is great Danger of losing both. What therefore must be done by a prudent Physician and good Christian in so difficult a Case? In this Difficulty, my Opinion is, that the Cæsarean Section should never be performed on account of its great Danger to the Life of the Mother, but when it is strictly commanded by a King or Prince, who is without Heir, to keep up the Line; or in some of the Cases mentioned at N^o 12. especially when the Mother is willing to undergo the Operation, to save her Infant. But without those Conditions, the Surgeon should rather wait as long as the Mother's Strength will permit, and endeavour to assist her Delivery with his Hands, till he presumes the Fœtus to be dead, which may be then extracted with Instruments. But if the Fœtus be yet living, the Mother's Strength fails her, and malignant Symptoms are drawing on, while excruciating Pains make her cry out for the Surgeon's Assistance; it is then better to save the Tree for future Productions, by a timely Extirpation of the offending Branch, than to lose the whole by Delay. If the Infant dies by the

^a As I have frequently found by Experience, with the Consent of the best Practitioners in Midwifry, notwithstanding some boast they can always invert the Fœtus with their Hands.

^b The Extraction of the Fœtus by Instruments in impracticable Births is advised by RIOLAN, *Enchirid. Arat. Lib. II. Cap. 28* and AMMANUS, *Med. Crit. Cas VI. Pag. 26*. DEVENTER, *loc. cit. Part II.* HORATIANUS, *Lib. III. Cap. VI.* SIGISMUNDA, *Lib. cit. Cap. V. aliique.*

Operation, it is not done voluntarily, but by Accident, to save the Cause (which is always greater than the Effect) to which, next under God, it owes its Being. Some will perhaps say cantingly, that it is against the sixth Commandment, *Thou shalt not kill*; and that an Evil is not to be committed for the Production of Good, and the like. But I think the Matter clear enough to obviate those Quibbles of itself, and shall therefore leave it. The Surgeon is so far from killing, that he most studiously endeavours to save the Life both of the Fœtus and Mother: but if both cannot be saved, it is beter to save one than neither. More may be seen on this Subject in BECKERUS, *De Infanticidio licito ad servandam puerperam*, where these Objections are obviated at large, and the Case put in a clear Light. ROSSETUS has written learnedly and professedly on the Cæsarean Birth. But those who have not his Treatise, may see a Compendium of it in SCULTETUS's Explanation of the Table belonging to the *Sectio Cæsarea*, which, in the *Francfort* Edition, is *Tab. XLII.* but in that at *Amsterdam*, it is *Actuar. I. Tab. X. Pag. 29.*

C H A P. CXIV.

Of Herniæ or Ruptures in general, and particularly of the Umbilical, and its Method of Cure.

I. **T**HE Generality of preternatural Tumors formed in the Abdomen, and particularly the Navel, Inguen, and Scrotum, by a Protuberance of the Intestines or Omentum, are usually distinguished by the general Name of *Herniæ* or *Ruptures*. These Tumors differ first according to their *Place or Situation*. Those formed at the Navel are called *Omphalocele* or *Exomphalos*; those in the Groin *Bubonnocele*; and those of the *Scrotum*, *Osccheocele*, &c. They are also, secondly, distinguished from the Body of Substance contained in or forming the Tumor. When they proceed from a Protuberance of the Intestines, they are called *Enterocoele*; when from the *Omentum*, *Epipllocele*; if from Flatus or Wind, *Pneumatocele*; and if from Water, *Hydrocele*, &c. They are also distinguishable by Circumstances less remarkable: as from their Size, being either small, large, or enormous; from their Consistence, being either hard, soft, fixed, or moveable, capable of being returned into the Abdomen or not; which latter are called *adhesive* Ruptures. Sometimes the Parts prolapsed are so confined by Stricture and Inflammation that the Flatus and Fæces cannot be returned; which kind of Ruptures are called *incarcerated*. Some are free from Pain, others attended with it, or with Sickness, Vomiting, and other bad Symptoms, particularly the *incarcerated*. And with Respect to their Duration, they are very properly distinguished into *recent* and *inveterate* Ruptures: which Consideration is of great Use in the Method of treating them.

II. An *Omphalocele*, *Exomphalos*, or *Hernia Umbilicalis*, is a preternatural Tumor of the Abdomen at the Navel, from a Rupture or Distention of the Parts which invest that Cavity. These Ruptures differ by their Size and Figure: some being small, especially when recent; others large, and sometimes monstrous. Some are of a round Figure, others acuminate or cylindrical: and

Of Ruptures
in general.

Description
and Kinds
of the Om-
phalocele.

I. lately.

I lately observed an umbilical Rupture in a Woman with Child, which resembled the Size and Figure of the Penis, and was very painful, but contained nothing except Wind or Air. Umbilical Ruptures are again distinguished according to their Contents: as, if from the Intestines, *Enteromphalocoele*; from the Omentum, *Epiplomphalocoele*; if from Air or Wind, *Pneumatomphalocoele*: Some of these Tumors are again distinguished by their Consistence, into hard or soft, returnable or not, painful or incarcerated, &c. Figures of these Ruptures have been exhibited by SCULTETUS, *Armament. Chirurg. Tab. XXXVII.*

Causes of an
Exemphalos.

III. These Tumors arise from various Causes. But the immediate Cause is always some Force exerted upon the Abdomen, especially near the Navel; such as a violent and sudden Motion, a Fall, violent Blow, or Leap, strong Coughing or Sneezing, straining to lift great Weights, difficult Labour in Women, and the like - by which Causes the *Peritonæum* at the Navel is either dilated, or sometimes quite broke, as DIONIS observes, especially when that Membrane is weaker or more relaxed than usual. The dilated Parts at the Navel contain sometimes the Omentum and Intestines, either separate or together, and sometimes only Wind or Flatus. A natural Weakness and Relaxation of the *Peritonæum* at the Navel, may be often the Cause of its being distended with the Intestines or Omentum in Children; especially when assisted by some Violence, as those beforementioned, or strong Crying: which frequently produces this Disorder soon after the Birth, as I have sometimes observed, especially if the Abdomen and Navel-string are not properly secured by rolling.

Diagnosis.

IV. This Disorder discovers itself both to the Eye and Touch. The Navel appears more prominent or protuberant, than in its natural State; and the Tumor being pressed with the Fingers usually returns into the Abdomen, (except there is an Adhesion) affording a Sort of flatulent Sound, especially when the Patient is laid on his Back, which is a Sign that the Tumor arises from a Prolapsus of the Intestines. When the Tumor gives little Resistance, and appears very soft, it may be reasonably supposed distended with Flatus, or with the Omentum only: though the latter is usually accompanied with the Intestines, as it lies before, and is protruded by them. When the Omentum only is concerned, it is called *Hernia Omenti*; when only the Intestines, *Hernia Intestinorum Umbilicalis*. If upon returning the Intestines into the Abdomen the Tumor appears to be still in some Measure distended, we may reasonably conjecture, that it is also formed in Part by the Omentum, which may be sometimes returned together, with the Intestines. The Navel is also frequently observed to be greatly distended with Water in dropical Subjects: remarkable Instances of which have been given and represented by SCULTETUS and PURMANNUS *Chirurgia Curiosa, Pag. 330. Tab. V.* But these Tumors are distinguishable from the rest by the hydropical Habit of the Patient, and may be called *Hernia umbilicalis aquosa*, as that containing Air may be termed *ventosa*, or *flatulenta*.

Prognosis.

V. The *Omphalocoele* in Infants is usually without Danger, and may be generally returned and cured without much Difficulty: nor is it to be judged dangerous in Adults, so long as the prolapsed Parts may be freely returned without any Adhesion. But if it proceeds from a Prolapsus of the Intestines through a very narrow Aperture, occasioned by some Violence in Adults, so that it cannot be returned: there is then great Danger of a Mortification in the Intestines preceded

preceded by Inflammation, violent Pain and Vomiting, and sometimes the iliac Passion, in which the Fæces are voided by the Mouth; all which will probably terminate in the Death of the Patient. But when the Disease has advanced but slowly, and the Perforation in the Peritonæum is yet sufficiently open to return the Intestines, the Patient is then in no great Danger, especially if it be an Infant or Child. If no Assistance can be had immediately from the Surgeon to keep the Parts in their proper Situation, they should be defended from the Cold, the Patient should abstain from violent Exercise, and live upon a spare, light, and animal Diet, which affords no Flatus. But when the Disorder is become inveterate in an Adult, attended with the bad Symptoms before mentioned, we too often find by Experience, that all chirurgical Operations, which are usually applied in these Maladies will be to no Purpose, especially if the Hernia be large, in which Case the Patient frequently dies, either in or soon after the Operation. When the Intestines are returnable into the Abdomen in Infants and Children, this Disorder may be sometimes cured by a proper Girdle or Bandage, Diet, and Regimen, so as to be in no danger of returning, if they avoid violent Exercise, and observe a proper Regimen. If the Contents of the *Omphalocele* appear to be Wind or Flatus, there is little or no Danger: but if it contains Water, it threatens a consequent Dropsy.

VI. The Method of Cure is twofold; according as the Intestines are return-
able into the Abdomen or not: if the first can be practised, it should be done without any Delay, and the Parts secured against a future Relapse. When the Surgeon therefore finds that the Aperture, through which the Intestines have been forced, is large enough for this Purpose, the Patient is then to be laid on his Back, and the Parts gently pressed with the Hands and Fingers till he perceives they are returned; after which, the Remainder of the Treatment differs according to the Age of the Patient. In young Infants it may be frequently sufficient, as I have experienced, to prevent a Return of the Intestines and Omentum by a Compress or Lump of *Empl. ad Herniam*: which being applied to the Navel, is to be retained by a Plaster of the same Kind; over that a simple but thick Compress, with a common Linen Bandage of about three Fingers breadth, carried circularly round the Abdomen, observing to make it a little tighter at every Dressing: by which Means a Cure may be often completed in a few Weeks. But in a worse Kind of the Disorder, I use a double Compress, putting a thin Plate of Lead into the least and lowermost, binding it up on the Part as before. In Children, Adults, and old People, it will be necessary to use a kind of Girdle fitted with a Plate or Ball, as CELSUS observes, which are to be fastened round the Abdomen to prevent a Relapse of the Intestines or Omentum, like that represented in *Tab. XXIV. Fig. 6.* which is made of Leather, and the other at *Fig. 7.* of Steel: though there are several others of the like Kind, which are not contemptible in this Disorder. See SCULTETUS, *Tab. XXXVII. Fig. 6.* But before an Instrument of this Kind is used, the Parts should be first secured with a Cake of Emplaster, Compress, and Bandage, as before, the Success of which I have frequently experienced in young Subjects, who, by continuing the Girdle for some Months only have been thoroughly cured. But in Adult and old People this Instrument should be

1st Method
of Cure.

wore:

wore through the whole Course of their Life ; or they will be in continual Danger of relapsing upon any Violence, which they should cautiously avoid.

The ancient
Method of
Cure.

VII. The preceding Method therefore appears upon Examination to be only a partial Cure in Adults : nor do we find any absolute Method of curing the Disorder, so as to prevent a Relapse, described by any of our modern Surgeons, except SAVIARD. We are informed by the excellent CELSUS, that the Ancients were very solicitous to remedy this Disorder, for which they contrived various Methods ; the chief of which we shall here transcribe for the Information of the Surgeon. He says “ the Patient is to be first laid upon his Back, “ that the Intestine or Omentum may be returned into the Abdomen : and the “ umbilical Perforation being then empty, the Slit is to be tied together from “ the Bottom with a Needle and two Threads, each of which are to be fasten- “ ed with two Knots on opposite Sides of the Wound : by which Means the “ Parts above the Ligature will be compressed, withered, and fall off, and a “ firm Cicatrix formed beneath.” Some make a longitudinal Incision before they undertake this Method, that by introducing their Finger the Intestine and Omentum may be thereby returned, and to prevent the Intestine and Omentum from being made fast to the Wound. Others again cauterize the Parts, that have been thus secured, either with Caustics or the actual Caution, to make the stronger Cicatrix : after which, they cure the Wound, like others from burning. This Method is not only the best, where there is a Rupture of the Intestine, Omentum, or both, but also in humoral Ruptures : but it requires the Patient to be of a good Habit, and neither an Infant nor an old Person. So far CELSUS agrees with the Observations that have been made by many of our modern Surgeons, in order to render the Cure of this Disorder more perfect in Adults.

SAVIARD'S
Method.

VIII. SAVIARD, a Surgeon at *Paris*, had the Care of a little Girl of 14 Months old, who had an umbilical Rupture about the Size of a Goose Egg. After laying the Child on its Back, and returning the Intestines, he gave it to an Assistant to be held upright ; and then tied up the Skin round the Bottom of the Tumor, with a Wax Thread folded four Times together. After two Days time he renewed the Ligature, whereupon the Tumor began to putrify : and in three Days time more he made a third Ligature tighter than either of the former ; by which the Tumor was entirely separated, and the Girl cured. The same Method was afterwards repeated with Success upon another Girl, as he informs us, in *Obs. Chirurg.* 9. It is a little surprizing, that GARENGEOT takes no Notice of this Method of Cure : and SAVIARD himself does not inform us, whether the two Children were not curable by Bandage, and the more simple Method at N^o 6. before he undertook this more severe Practice.

IX. If the Intestine cannot be returned, through the Straitness of the Aperture in the Peritonæum, but the Patient is tortured with violent Pain in the Part affected, with Vomiting and other bad Symptoms ; to apply the Girdle or Bandage in that Case, would be not only useless but pernicious. The Patient should be rather treated with emollient Clysters and Cataplasms, to relax the Parts and facilitate their Return. But if those are not sufficient, after they have been continued some Time, and the Intestine cannot be yet returned, it may be of great Service to the Patient to inject the Smoak of Tobacco by the Tube represented in *Tab. XXXIV. Fig. 12.* inserted in the Anus, till the Intestines are thereby

thereby relaxed and discharged of their Contents. From this *Clystma Fumosum* I have often experienced surprizing Success. If the Patient is of a full Habit, and inclined to be feverish from the Pain and Inflammation of the Parts, it may be then proper to bleed, as in other inflammatory Disorders; and afterwards bathe the Tumor with *Sp. Vini*, or with red Wine: by which Means the distended Vessels of the Intestine will be contracted, and probably afterwards be returned by a gentle Pressure of the Hands, to be then secured with Compress, Bandage, and a proper Instrument as before.

X. If the Disorder continues four and twenty Hours, and becomes still worse after Bleeding and the Use of other Medicines, the Surgeon should then immediately proceed to the Operation, without which there will be but small Hopes of the Patient's surviving. And even then, if the Disorder has continued above a Day and Night in a young Person of a full Habit, the inflamed Part of the Intestine will be probably found mortified, and the Operation of no Effect: but the Patient soon after expires, with a violent Vomiting, Weakness, and cold Sweats. For the Operation itself, it consists chiefly in dilating the Wound of the Abdomen, so as to make it large enough to return the Intestine. In order to this the Patient should be laid upon a Bed or Table, with his Head depressed, and his Abdomen and Back-side elevated, and being secured by Ligatures or the Hands of two or three Assistants, the Surgeon proceeds to make a transverse Incision through the Integuments, which should be held up in the opposite Part by an Assistant; taking Care not to wound the Intestine with the Scalpel. Upon which Account it may be safer to make a small Puncture, and insert the Director *Tab. I. Lit. M. N.* under the Skin to guide the Knife. And if the Tumor be large, so that a longitudinal Incision be not sufficient, a cruciform Incision may be made, and the four Angles of the Integuments elevated carefully with the Knife and Fingers, so as not to injure the Intestine. After which the dilated Peritonæum, which immediately invests the Intestine, may be carefully elevated, and dilated with as small an Incision as possible; guiding the Knife in a Director to avoid injuring the Intestine, which may be afterwards depressed and returned into the Abdomen, as we before directed, in treating of a Prolapsion of the Intestines by a Wound of the Abdomen. *Part I. Book I. Chap. V.* The Surgeon may avoid injuring the Intestine by dividing the Peritonæum with a Pair of Scissars, having obtuse Points; or with a Scalpel that has a Button upon its Point, as in *Tab. V. Fig. 3, 4, 5.* or by otherways securing the Point with his Finger, which should be conveyed with it into the Abdomen, till he has made an Opening large enough to return the Intestine. When the Omentum is hurt, which often happens, you should make a Ligature on the corrupted Part, that it may separate from the sound. If it is very much corrupted, you must apply different Ligatures in different Parts, and cut off what is superfluous: thus you will prevent an Hæmorrhage. Where the Omentum and Intestines are sound, a linen Ball should be applied to the Middle of the Wound, the neighbouring Parts filled with dry Lint, covered with a thick Compress, and secured with a slight Bandage. But if the Parts are vitiated, you must dress only with the Lint and Compress; and then heal it, like other Wounds of the Abdomen.

Cured by
Incision.

New Instru-
ments de-
scribed.

XI. Instead of the preceding Instruments, to avoid injuring the Intestines in dilating the Peritonæum, modern Surgeons have contrived others more safe, and particularly the Director, *Tab. XXIV. Fig. 8.* furnished with a Pair of Wings, AA, to press down the Intestine while the Scalpel is directed in its Groove. To dilate Wounds of the Abdomen, which intercept and strangle the Intestines, MORAND has contrived a Sort of Knife, called by the *French a Gastroraphic Bistouri*, *Tab. XXIV. Fig. 9.* which I forgot to mention in treating of Wounds of the Abdomen. This Instrument being inserted into the Abdomen by its obtuse or probe End, marked A, up to B, the two Handles CC, are then opened with the Fingers like a Pair of Scissars; and the moveable Arm D, having a sharp Edge like a Scalpel on its upper Margin EE, the narrow Aperture is thereby divided or dilated, till it is large enough to return the Intestine. For the same Purpose, in Ruptures, LE DRAN has invented a Kind of a latent Scalpel, *Tab. XXIV. Fig. 10, 11.* The first Figure shews the Instrument shut or concealed; but in *Fig. 11.* it appears open with all its distinct Parts. The Part AA, *Fig. 10.* is inserted into the Foramen of the Peritonæum, to be dilated: and the Handle K being held in the right Hand, the Plate F is depressed with the Thumb; by which Means the Scalpel concealed in the Groove AA, is elevated as in *Fig. 11. lit. CD*, in such a Manner, that the Point D always remains in the Groove, that it cannot wound or prick the Intestines, while the Edge between C and D divides the Peritonæum. But we shall give a more ample Description of this Instrument in our Explanation of the XXIVth Plate following.

The Dress-
ing.

XII. When the Intestines have been returned by either of these Means, the Lips of the Wound are to be held and compressed by an Assistant, till they have been secured by the knotted Suture: after which it is to be dressed and healed, as we have before directed, in *Part I. Book I. Chap. V.* concerning *Gastroraphia*. After the first Dressing the Patient should rest in an easy Posture for three or four Days, before it be again renewed, to promote the Agglutination of the Wound, unless something forbid. After the first Opening, the Wound may be then dressed every Day, and retained with a strict Bandage, as in other Wounds of the Abdomen: and when the Wound is healed, it will be ever after necessary for the Patient to wear a Girdle, to strengthen the Parts, and prevent a Relapse of the Disorder. But if the Patient was an Infant or Child, the Parts frequently unite so firmly as to require no such Assistance.

PETIT'S
Method of
Cure de-
scribed.

XIII. We shall, for the Satisfaction of our Reader, here transcribe the Method recommended by PETIT, as we find it briefly inserted in the *chirurgical Operations* of GARENGEOT. First, the Integuments upon the Tumor are to be elevated on one Side by the Hand of the Surgeon; and on the other, by an Assistant: after which a cruciform Incision is to be made, and the Lips of the Wound are next to be raised or dilated, either with a Scalpel and Director alone, or assisted with the Fingers. The Membrane of the Peritonæum then appearing, is to be carefully divided with a crooked Scalpel; and the Index, or else the middle Finger introduced, that the crooked and obtuse pointed Scissars (*Tab. I. Fig. D*) may be thereby directed, to divide the Sacculus in a cross Position. And if any Part should be found to adhere preternaturally, as the Omentum and Intestines sometimes do, they are to be carefully separated or divided by

by Incision. If now the Omentum does not appear to have fallen through the Ring of the Navel, it is a good Sign. But if the contrary, and it appears much enlarged, the Disorder is dangerous, whether it be returned or cut off: and notwithstanding the prolapsed Intestines are often returned in this Manner, Death sometimes follows. Yet they ought to be decently replaced, if the Aperture of the Peritonæum is large enough: but if it is too strait, it should be dilated with a Scalpel, armed with a Button at the Point, as in *Tab. V. Fig. 3, 4, 5.* which being introduced, is to be directed obliquely upward and towards the left Part of the Abdomen, to make the Dilatation. But if the Hernia or Tumor is not very large, PETIT's Method is then to dilate the Peritonæum without Incision, and to return it together with the Intestine: but in what Manner he dilates the Aperture of the Peritonæum without Incision, he does not acquaint us, nor can I easily imagine.

XIV. After the Operation he proceeds to a Deligation and Cure of the wounded Parts. This he orders to be done without Suture, by a Ball of Linen, which he calls a Pellet, dipt in the White of an Egg; which being fastened to a Thread is applied to the Foramen, through which the Intestines were prolapsed. The rest of the Wound is then filled with Bits of Linen rolled up with Cylinders of scraped Lint, in French *Bourdonnets*: then, after anointing the external Parts of the Wound with Oil of Roses, three or four Compresses one larger than another are applied over the whole, and retained by the Napkin and Scapulary. The next Day he directs the Pellet or Ball to be removed from the Aperture of the Wound, notwithstanding its firm Adhesion: after which, he tells us there remains no Vestigia or Appearance of the late Foramen or Wound. But how the rest of the Wound is afterwards to be healed, he does not tell us. For the rest of the Cure, especially for the first Days, Bleeding, Clysters, and a proper Diet, are judged greatly to contribute.

The Dressing used by PETIT.

XV. DIONIS, in his Surgery, tells us, that the *Exomphalos* never proceeds from a Dilatation, but a Rupture of the Peritonæum: and that therefore the Intestines are not to be found near the Cutis and Integuments, nor lodged in a Sacculus, according to the received Opinion. But that DIONIS is greatly deceived in this Notion, may appear from the forecited Observations of LE DRAN, published *Ann. 1722. Pag. 188.* as well as from an Observation of my own. During my Professorship at *Altorf*, a Nobleman of a lusty and obese Habit had an *Exomphalos*, as represented in *Tab. XXIV. Fig. 12.* where the Letters AAAA denote a kind of large Ring in the Integuments or near the Navel: in this was contained the Peritonæum dilated and pellucid, through which might be seen the Intestines BBB in the living Subject. So long as the Patient wore a Girdle, with a hard Compress or Pillow upon the Part, represented in *Tab. XXIV. Fig. 6.* the Intestines remained in the Abdomen in their natural Positions: but upon removing the Supports, the Intestines immediately protruded into the thin Membrane, forming a Sort of Bag, protuberant at the Navel. It is probable, other Surgeons and Physicians may have made Observations of the like Kind; and at least, I have GARENGEOT and PALFYN agreeing with me in Opposition to DIONIS, who both affirm that the Intestines are contained in a kind of Sacculus or Dilatation of the Peritonæum. But we are not totally to deny, that the Opinion of DIONIS may sometimes be true: for some Cases have been doubtless observed, as well in dead as living Subjects, where the In-

The Opinion of DIONIS examined.

testines have not been confined in a Sacculus of the *Peritonæum*, but protruded under the Integuments, through a Rupture of that Membrane. However, the Surgeon should be careful not to be imposed upon, by mistaking the Intestine itself for the Sacculus, the wounding of which would perhaps be fatal.

An EXPLANATION of the TWENTY FOURTH PLATE.

Fig. 1. The *Trocar*, consisting of a triangular pointed steel Bodkin, included in a silver Cannula, serving to tap or perforate the Abdomen and Scrotum in dropical Patients. A, its Handle; B, its triangular Point; CC, the including Cannula or small Pipe.

Fig. 2. and 3. is the same Instrument asunder. BC, the steel Bodkin that makes the Perforation; A, its Handle (*Fig. 3.*) is the silver Cannula or Tube; AA, the Part to be inserted into the Abdomen. C, Two oval Apertures on each Side, that the Water may enter not only at the End, but on each Side; BB, a round Plate, with two small Holes, by which it may be fastened to the *Abdomen*. D, the Orifice of the Tube, by which the Water is discharged.

Fig. 4. Represents another kind of Cannula for the same Purpose invented by PETIT. AA, a long Slit in the Cannula in its upper Part, which the Inventor supposes will promote the Discharge of the Water. B, the Aperture, by which the steel Bodkin enters, and the Water is discharged. CC, another Plate made hollow like a Gutter, by which the Water is conveyed down into some Receptacle.

Fig. 5. Is an Instrument for the crooked or hump-back made of Steel, in the Form of a Cross. AAAA, the cruciformed Part, which is applied to the Back and Shoulders. BB, a steel Collar for the Patient's Neck, which should be lined with Silk or Leather, and may be taken up or let out by the Clasp aa. CC, are two Girts of Leather, to be fastened round the Shoulders, the Left being open to shew the small Holes, by which it is to be fastened with a tagged Lace: the Right shews the Manner it is to be fastened to the Shoulders. EE, is a Girdle passed through the Holes F, to be fastened round the Waist.

Fig. 6. Represents a kind of Belt for depressing the umbilical Rupture. A, is a steel Truss covered with Leather or Linen Cloth, which is to be applied to the Navel upon Cotton, over the Compresses and Plaster, being furnished with a Protuberance or Button in its Middle, represented at D. BBB, is the Girdle of Leather or Linen Cloth fastened by the Buckle C.

Fig. 7. Is another Instrument for the same Purpose, made of strong Brass or steeld Wire, bent in the particular Manner here described. A, the Part applied to the Navel; BB goes round the Abdomen; and CC are applied to each Inguen: and thus by the Elasticity of the Instrument the Navel and Abdomen are compressed: before it is used, it should be covered with soft Leather or Callico, and the Part A should be filled up with boiled Horse-hair, or such other like Substance, and the whole is to be adapted to the Size of the Patient.

Fig. 8. Is a Director to guide the Knife and prevent it from injuring the Intestine in the Operation for Hernia's. AA, two Plates in the Form of a Heart to press down the Intestine, that it may not be wounded by the Edge of the Knife.

Fig. 9.



Fig. 9. The Gastroraphic Incision Knife of MORAND, to be used in the same Case with the preceding. A, is the obtuse or probe End to be inserted into the Abdomen; B, the Hinge, by which the two Parts of the Instrument are joined; CC, the Handles for the Fingers; D, the moveable Arm of the Instrument, which is round and obtuse in its lower Part, but with a sharp Edge EE upward, by elevating which the Parts are to be divided and dilated.

Fig. 10, 11. Represents the Scalpellum Herniarium or Bistouri of LE DRAN. The first represents it close, but *Fig. 11.* shews it open, that its internal Structure may be the better perceived. AA, a hollow Director, in which is concealed the small Incision Knife C, which is in the open Figure elevated out of its Groove B; D, the Point of the Scalpel, which moves in the Groove, being fastened, that it cannot slip out; EE, the Leaver, which elevates the Scalpel; F, the Handle of the Leaver, which is depressed by the Thumb to elevate the Scalpel; G, a steel Spring, which elevates the Leaver when it is not pressed by the Thumb, by which Means the Scalpel is again concealed in the Groove; HH, two lateral Wings, which cover and defend the Intestine; II, two exact Wings, which include and sustain the Leaver; K, the Handle of the whole Instrument; L, the Screw upon which the Leaver turns.

Fig. 12. Represents a large Tumor or *Hernia Umbilicalis*. AAAA, the Skin of the Navel very much distended in the Form of a Ring, above two Inches diameter, in which appeared a thin pellucid Membrane, the Peritonæum, through which might be seen the small Intestines BBBB contained in the Abdomen.

C H A P. CXV.

Of other HERNIÆ, *and particularly those of the Abdomen, or the* HERNIA VENTRALIS.

I. **W**E have already observed, that a Protuberance at the Navel caused by the Intestines or Omentum, is termed *Omphalocele* or *Hernia Umbilicalis*. But when the Intestines or Omentum cause a Tumor in other Parts of the Abdomen, it is differently denominated: *Oschiocèle*, when in the Scrotum; *Hernia Inguinalis*, when in the Groin; *Cruralis*, when in the upper and anterior Part of the Thigh; and *Ventralis*, when in any other Part of the Abdomen; as is sometimes observed in the *Linea Alba*, either above or below the Navel. These *Herniæ* are usually distinguished into *true* and *spurious*. The true are those formed by a Prolapsion of the Intestines or Omentum. The Spurious are those formed by other Bodies, as the *Hydrocele*, *Sacocèle*, *Varicocèle*, &c. We shall first consider the *Hernia Ventralis*, which has been either slighted or wholly neglected by the surgical Writers of the last Century. But as the Disorder is not only described by the Ancients^a, but also frequently occurs in our own Time, some Instances of which I have had myself, it will be agreeable to our Undertaking to consider it particularly in this Place. As to their

Hernia Ventralis described, with its Kinds.

^a See CELSUS, B. vii. C. 17.

Difference, some are large, others small, and seated either in the Middle or on the right or left Side of the Abdomen. Some are easily returned again into the Abdomen, attended with no Inconvenience: others cannot be returned, are attended with grievous Symptoms, and are therefore called incarcerated.

Causes.

II. With Regard to the Causes of these Disorders, there are two Opinions. DIONIS and others will have them proceed from a Rupture of the *Peritonæum* by some Violence. Whereas GARENGEOT will have them to proceed not only from a Rupture of that Membrane, but more frequently from a Dilatation of the *Peritonæum*, when it is not equally pressed by the abdominal Muscles, through a Wound, Relaxation, or other Defect, especially in the transverse Muscles: so that by the stronger Action of the other Muscles the Intestines are forced, and the *Peritonæum* dilated in that Part where there is the least Resistance.

Diagnosis.

III. A *Hernia Ventralis* may be discovered from the Tumor and Inequality of the Integuments more in one Part than in another. The Tumor itself gives Way to the Pressure of the Hand and returns into the Abdomen: but upon removing the Hand it returns again with a Sort of murmuring Noise. When the Patient coughs, breathes deep, or strains, in lifting any Weight, or going to stool, the Tumor then increases and affords a greater Resistance to the Touch. But in the incarcerated Kind, when the Intestine cannot be returned, the Disorder is also accompanied with the Symptoms belonging to the *Omphalocele* or *Hernia Umbilicalis*. To which we may add, that the Disorder is common to Subjects of all Ages, appearing not only in Infants and Children, but more frequently in Adults.

Prognosis.

IV. It may be here proper to caution the Surgeon, lest he should mistake this Kind of Rupture for an Abscess in the Abdomen, and proceed rashly to open or treat it accordingly. That such a Mistake may be easily made by the unskilful, I am convinced, from an Instance within my own Knowledge; in which a Surgeon intended to have opened one of these Tumors as an Abscess, and have probably cut through the subjacent Intestines, as well as the Integuments of the Abdomen, if I had not better informed him and persuaded him to the contrary. When the Disorder is of long standing in Adults, and especially in old People, the Cure of this Disorder is very difficult, as it also is hardly ever cured, when occasioned by a Wound of the Abdomen, because the *Peritonæum* is then wanting. If the Aperture of the *Peritonæum* be small and contracted, so as to compress the prolapsed Intestine, the Case is very dangerous, as in umbilical Ruptures, being frequently attended with most acute Pain, Inflammation, Vomiting, and even the iliac Passion. And if the Intestines come through the *Linea Alba* above or below the Navel, the Disease is universally allowed to be almost incurable: but as the Opening of the *Peritonæum* is usually larger in these than other Ruptures, they are on that Account generally esteemed less dangerous.

Cure.

V. Though this Kind of Rupture may be attended with many bad Symptoms from the Division of the *Peritonæum* and Stricture upon the Intestines, if left to itself; yet if it be recent, and in Infants or Children, there is no doubt but it may be remedied, or at least alleviated by the Assistance of Art. In this Case, the Girdle at *Tab. XXIV. Fig. 6.* will be found of the greatest Benefit; especially

cially if the Compress marked A, be sufficiently large, and constantly retained upon the Part, secured with a Plaster and proper Dressings. Which Instrument will be also of great Use to Adults, to prevent the Disorder from growing worse, when of long standing, and incurable. We learn from CELSUS^a, that the Ancients had a Method of curing these Ruptures, like those of the Navel (N^o 7.) preceding, by Ligature: and when the Parts mortified and fell off, they untied the Lips of the Wound by Suture, and cured it as other Wounds. But I can by no Means approve of such a Practice, as the Intestine itself may be tied up with the Integuments and mortified with them. The most rational Method will be to dilate the Peritonæum by Incision, return the Intestine, and manage the whole as in the *Omphalocele*; which has been practised with Success by PETIT, on a Taylor, who was well within five Days after the Operation. An Example of a ventral Hernia, after the Cæsarean Section, may be seen in SAVIARD, *Obs. Chirurg.* 59.

C H A P. CXVI.

Of the BUBONOCELE, or HERNIA INGUINALIS.

I. **A** *Bubonocèle* is a Tumor in the Inguen formed by a Prolapsus of the Intestines, Omentum, or both, through the Processes of the Peritonæum and Rings of the abdominal Muscles. The Tumor is generally formed by a Prolapsion of the small Intestines: but I have sometimes known it from the Colon and Cœcum, especially in the right Inguen. Not only Men but Women are also subject to this Disorder, in which latter the Intestines have come down so low as to be even with the *Labia Pudendi*. These Ruptures are sometimes formed in Part by the Bladder, especially in gravid Women, according to the Observation of RUYSCH, PETIT, and others. The Uterus itself has been also observed by HILDANUS and RUYSCH, to make Part of these Tumors. Great Care should be therefore taken to distinguish these Ruptures from Bubos, and other Tumors, or Abscesses, lest by wounding these Parts the Patient's Life might be endangered.

Bubonocèle described.

II. The *Bubonocèle* may arise from two Causes like the *Exomphalos*: either from a Relaxation of the Peritonæum and Rings of the abdominal Muscles, or from some violent Contraction and Pressure of the abdominal Muscles upon the Intestines, as in jumping, lifting great Weights, coughing, hallowing, blowing a Trumpet, riding on Horseback, some Fall or Blow, violent Vomiting, difficult Birth, &c. by which Means the Peritonæum is either lacerated, or, according to the general Opinion of the Moderns^b, so far dilated, as to let through the In-

Causes.

^a *Medic. Lib. VII. Cap. 17.*

^b Many, and I believe, the greatest Part, of our Modern Surgeons (particularly HILDANUS, *Epist. de Hernia Uterin.* NUCK, *Exper. Chirurg. Cap. de Hern. & Adenograph.* p. 171. and RUYSCH, *Obs.* 18. *Advers. Anat. Dec. II. aliquæ*) are of Opinion that the Peritonæum does not burst, but is only dilated in these Ruptures. But though their Opinion is oftner true than the other, yet the Peritonæum is sometimes ruptured by great Violence, as ÆGINETA observes, *Lib. VII. Cap. 65.* which is also confirmed by the Observation of ROSSETUS, BARBET, and GARENCEOT, as well as myself.

testines, Omentum, or both. Sometimes only one Side or Cell of the Intestine is pressed through the Peritonæum, according to the Observation of LITTRIUS in *Act. Acad. Paris. Ann. 1700.* MORGAGNI in *Adv. anatom.* III. p. 8. and 9. and RUYSCH in *Advers. Anat. Dec. II.*

Symptoms.

III. When this Disorder is formed insensibly, and by Degrees, it is attended with but few and slight Symptoms, unless the Fæces are indurated, or a Constriction and Inflammation of the Ring affect the Patient. In this Case it usually arises from taking Cold, violent Exercise or Straining, eating too plentifully of gross and flatulent Food, or violent Passion, as I have sometimes observed, which will frequently exasperate the Disorder, so as to strangle the Intestine in the Aperture of the Peritonæum, that its Contents can have no Passage. The Consequence of which will be violent Pain and Inflammation, Sickness, Vomiting, and the iliac Passion: to which Symptoms those are always exposed, who have an *Oschiocèle* or Prolapsion of the Intestines into the Scrotum. Therefore such as have a Rupture at the Navel, Inguen, or Scrotum, should be careful not to go without a proper Truss, which would endanger them of relapsing into a worse Kind of Disorder from the Causes here mentioned. Though it must be confessed, that such as are guarded with a Truss, do sometimes relapse in violent Riding or other Exercise, in which the Truss is either broke, loosened, or displaced, and the Intestine falls down. This formerly happened to the *French Duke DE VILLEROI* in Hunting, not without endangering his Life, as *DIONIS* mentions.

Diagnosis.

IV. The *Hernia Inguinalis* may be discovered from the Tumor thereby occasioned in the Groin, which proceeds up to the Ring of the abdominal Muscles: and when the Intestine is not incarcerated or imprisoned, but returnable into the Abdomen, the Tumor subsides upon lying down, and in other Postures. Upon pressing it with the Hand the Tumor feels soft, with an equal Resistance, as if one touched the Intestine distended with Wind, which frequently ascends into the Abdomen with a murmuring Noise; by which it may be distinguished from a Bubo. But when the Omentum only forms the Tumor, it has a greater Resistance, and cannot be easily returned. When the Omentum and the Intestines fall together, a soft Swelling generally remains, though the Intestines are returned. When the *Hernia Inguinalis* is incarcerated, so that the Parts forming the Tumor are not returnable into the Abdomen, it usually appears with a greater Resistance to the Touch, Redness, and Inflammation, the Patient being troubled with intense Pain, and a Fever, followed by a violent Vomiting and the iliac Passion, to such a Degree, that the Patient is thereby spent, and sometimes perishes in a cold Sweat, for want of timely Relief.

Prognosis.

V. These Ruptures are often attended with Danger, especially the incarcerated; in which, if the Intestine be not timely returned, but the Stricture continues two or three Days, red and livid Spots appear upon the Tumor, which denote a Sphacelus or Mortification: and if the Hiccough, and an universal cold Sweat seizes the Patient, he has generally but a few Hours to live. In this Case, many prudent Surgeons omit the Operation as useless, to avoid Reflexions, as being instrumental to the Patient's Decease. But when the Disorder is recent, the Symptoms mild, and the Patient strong, the Surgeon need not be then so hasty to perform the Operation. When the Omentum alone falls

falls down, there is less Danger, than when it is accompanied with the Intestines: though the Symptoms of an incarcerated Bubonocèle have been sometimes observed, when the Omentum has been found in the Rupture, upon dividing it. When the Redness and Resistance of the Tumor goes off, and it turns livid or black, the Patient being troubled with incessant Vomiting, weak Pulse, &c. it is a sure Sign that the Intestine is mortified also. When the Inflammation is communicated from the Intestine to the other Viscera, and the Abdomen appears distended, there is then little or no Hopes left of the Patient's Recovery. Lastly, if the prolapsed Intestine adheres to other Parts, so as to require the Operation, the Case is then also doubtful and precarious; the Operation itself being sometimes impracticable, especially in the crural Rupture, where it sometimes adheres to the Artery or Vein, as GARENGEOT has observed. The Notion, therefore, that the ancient Physicians never practised this Operation, seems in my Opinion to be true, as we find no Account thereof, either in CELSUS, ÆGINETA, or others. But as the Operation may be frequently, though not always successful, I think no Time should be lost before it is put in Execution.

VI. When the Intestine is returnable, the Patient should be laid on his Back, and his Thigh a little bent to relax the Integuments. Then the Tumor is to be gently pressed or returned with the Hands and Fingers: after which a Plaster and Compress are to be applied to the affected Part, retained with a proper Truss or Bolster, and Girdle or Bandage, several of which are exhibited in *Tab. XXV.* By keeping the Parts pressed close together in this Manner, without taking off the Truss for several Months, a perfect Cure is frequently obtained, especially if the Disorder was recent, and in an Infant or Child: and even in Adults, the ruptured Parts become so contracted, as not to admit a falling down of the Intestine, if they are not perfectly closed. And this Practice hardly ever fails of Success in any that are under twenty Years of Age: so that there is no occasion to subject the Patient to the Torture of dividing the Parts by Incision, when this milder Method will equally or better succeed. But Patients who are advanced in Years, should never leave off the Truss, nor perform any violent Exercise, if they are desirous to prevent a Return of the Disorder.

Method of
Cure when
the Intestine
is return-
able.

VII. But in some Patients these Ruptures cannot be retained by the Trusses and Bandage; or they will not submit to the Trouble of continuing them, perhaps to no Purpose. Here the Cure may be effected by a proper and prudent Incision; by which the Skin is separated from the Saccus Herniæ, and fastened to the Ring of the external oblique Muscle, after the prolapsed Parts have been returned: and that without Damage to the Testicles, or the Spermatic Vessels. But of this more at large, when we treat of the Cure of the Hernia Scroti. *Ch. CXIX. Sect. 12.*

VIII. There are some Cases, where the Rupture is not of the incarcerated, and the Ring of the Abdomen is wide enough, yet it cannot be returned, because both Intestines and Omentum adhere to the Saccus Herniæ. Here Trusses and Girdles can be of no Service; on the contrary, they would so compress the prolapsed Parts, as to cause Inflammations and other dangerous Symptoms; neither should I in such Cases advise an Incision: for we know not whether the Intestines may with Safety be separated from the cohering Parts. I would therefore recommend to these Patients Bandages only, just to support the Hernia

that its Weight be not troublesome, and, in some measure, prevent an Increase of the Rupture.

C H A P. CXVII.

Of the Hernia Inguinalis incaerata, or intercepted BUBONOCELE.

Method of
Cure when
the Parts
are not re-
turnable.

I. **W**HEN the prolapsed Parts in the Rupture are so incaerated or intercepted, that they cannot be returned into the Abdomen by the Hand of the Surgeon, whether it be from the Intestines coming through the Rings of the abdominal Muscles, or from a Stricture in the Sacculus of the Peritonæum, the Surgeon must then proceed to the Operation of dilating the Parts by Incision as before in the Omphalocele. But he may first try to restore the Parts by more gentle Means, as the repeated Use of Cataplasms, Ointments, and laxative Clysters, after bleeding, whereby the Stricture is sometimes removed, the Parts relaxed, and the Intestines may be returned by the Fingers without much Difficulty. In order to which, the Patient having made Water, is to be laid on his Back with his Head inclining, his Hips elevated, and his Thigh a little bent inward: the Intestines are then to be gently pressed in a circular Direction towards the *Os Ilium*, from whence they proceeded, and being returned, the fissured Parts of the Abdomen are to be compressed by the Hand of an Assistant, till the Dressings are applied. You must dress with a Plaster, and thick Compress of a triangular Figure, firmly secured upon the Part by a leather Girdle, or the Bandage called *Spica Inguinalis*, which should not be left off by the Patient for many Years; and if he be old, it should be wore during Life. I have sometimes known a Clyster of the Smoak of Tobacco succeed in relaxing the Parts, when others have failed; the Instrument for administering which we shall describe in treating of Operations belonging to the Anus. This last kind of Clyster particularly succeeded, when others were of no Effect, in a Man, who had laboured under an incaerated Bubonocèle, with all its malignant Symptoms, for the Space of three Days, when the Patient was supposed by every one to be near dying: I have since returned many other Ruptures by the same Practice; so that I have never yet had Occasion for the Knife in this Disorder^a. Some recommend the Application of Cloths dipt in cold Water, which, if the Disorder be recent, may sometimes succeed: but in some Cases may be dangerous, as promoting a Sphacelus^b.

Cure by
Incision.

II. When the Surgeon perceives that it is impossible to return the Intestine, and finds by the great Inflammation, Pain, and Vomiting, that the Disorder will be fatal, he should acquaint the Patient and his Friends with the great Necessity there is for him to undergo the Operation, to prevent a Morti-

^a A large *Clyfma fumosum* of the common *Englisb* or weak Tobacco, was injected into a poor Patient under this Disorder, but with no Effect. But the Smoak of strong *Virginia* Tobacco quickly gave the Patient a Stool, and the prolapsed Intestines soon returned into the Abdomen of themselves.

^b Some of our modern Surgeons rely greatly on the Exhibition of *Cort. Peruv.* in a Mortification of the Intestine. *Vide Commerc. litt. Norimb. Ann. 1735. Pag. 3.*

fication and consequent Death. When the Patient has submitted to the Operation, having discharged his Urine, he is to be laid on his Back upon a Table, or on the Side of his Bed: the Inguen should be also shaved, that he may meet with no Obstruction. The Patient's Head should be then inclined, his Hips elevated, and Thigh a little inflected, being secured or held firm by an Assistant. The Integuments are next to be taken up on each Side the Tumor by one Hand of the Surgeon and another of the Assistant, while he makes a longitudinal Incision with a Scalpel upon the Middle of the Tumor; after which he is to dilate or remove the Sides of the Wound from each other. But if the Integuments cannot be thus elevated by reason of the violent Inflammation, the Surgeon should then grasp the Tumor between the Thumb and Fore-finger of his left Hand, making the Incision downward, in a right Line, and with a light Hand, that he may not divide deeper than the Skin, so as to injure the Intestine. A Director is then to be introduced between the Tumor and divided Skin, and the Wound is to be enlarged upward and downward by an Incision Knife or Scissars; after which the Sides of the Wound are to be drawn asunder by Hooks or the Fingers, and the remaining Part of the *Membrana Adiposa* carefully divided, till the Intestine or its Sacculus, the Peritonæum, appear in view. GARENGEOT tells us, that the modern *French* Surgeons divide the *Membrana Adiposa* not perpendicularly with an obtuse Instrument, but obliquely with a Scalpel, till the Sacculus of the Rupture appears: but this should be done with great Circumspection, for fear of wounding the Intestines. The divided Integuments should be also elevated by the Thumb and Finger of the left Hand; and to avoid the Intestine, a small Opening might be made in the Peritonæum with the Point of the Scalpel, to introduce the Finger. If the Surgeon should meet with a Quantity of Water or Lymph, discharging itself by the small Aperture in that Membrane, he should not be surprized, being no more than usual; but should proceed to divide that Integument upward with a Pair of Scissars, or the Scalpel, *Tab. V. Fig. 3, 4, or 5.* (which GARENGEOT prefers to all other Instruments in this Case) till he comes to the Rings of the Abdomen. And if any large Blood Vessel should be by Accident divided, which would obscure the Work, it should either be taken up with a Needle and Thread, or compressed by the Fingers of an Assistant, who should also dry up the Blood with Lint or a Sponge. If the Intestine then appears to be found, it is to be returned by a gentle Pressure through the Ring of the abdominal Muscles. But as the Intestine is often wrapped in the Omentum as in a Sacculus, that must be incised quite to the Ring; and the Intestine replaced by the Fingers, if possible, without cutting the Ring. But if any Flatus or contained Fæces prevent its return, they should be first gradually pressed out: and if that also proves insufficient, the Ring of the abdominal Muscles itself should be divided, but inward or towards the Linea Alba, to avoid the epigastric^a Artery, which runs outward. If the prolapsed Parts should have any Adhesions, they should be carefully separated. The Ring of the abdominal

^a A large Hæmorrhage will probably ensue on cutting this Artery. But if you apply Lint to it, steeped in some styptic Liquor, and compress the Artery towards the *Os Ilium*, the Blood will easily be stanch'd with the Assistance of the subsequent Dressings. LE DRAN maintains that the Epigastric Artery is not easily injured in this Operation. *Op. Chirurg. de HERN.* And I am of the same Opinion.

Muscles may be divided, either with a Scalpel; or, to avoid the Intestines, with the Director, *Tab. XXIV. Fig. 8.* or with the Instrument of Mr. MORAND, *Fig. 9.* or of LE DRAN, *Fig. 10.* and for the same Purpose, the concealed Scalpel, *Tab. XXV. Fig. 1, 2.* has been a long Time in Esteem. But as this Instrument may injure the Intestine by its Point, which is elevated, the fore-mentioned are usually preferred to it: in using either of which the Intestines should be pressed down from the Instrument by an Assistant, which is the Use of the two Plates AA, in PETIT's Director, *Tab. XXIV. Fig. 8.* and of the Plate HI in LE DRAN's Instrument, *Fig. 10.* When the ruptured Part has been dilated, and the Intestine returned, the Wound is to be dressed with linen Compresses of a triangular Figure, and retained by the Bandage called *Spica*: though some scarify the Ring of the Abdomen, to make a firmer Cicatrix, and prevent a Return of the Disorder. But of this more at large, in N^o 9.

Other Methods of Cure used by ARNEAU and PETIT.

III. Though the Patient may be happily remedied by the Means already proposed, it may not be amiss to acquaint our Reader with the Practice of two considerable Surgeons at *Paris* in the same Disorder. ARNEAU, having divided the Integuments with a Pair of Scissars, in the Director, *Tab. I. MN*, then dilates the Lips of the Wound with his Fingers, and gently separates them from the subjacent Tumor: which Tumor he takes up between the Thumb and Fore-finger of his left Hand, and divides the Membranes, which cover the Sacculus of the Intestine, one after another, with a crooked Scalpel. If any small Veins occur, they are tied up in two Places, and then divided, that his Work may not be obscured by their bleeding. But if any Blood should issue from the Wound, it must be cleansed with a Sponge or Lint. Any Part of the Integuments, which adheres to the Sacculus, he separates with his Fingers, or with a Director, and Probe Scissars. This being rightly performed, he elevates the upper Part of the Sacculus by his Fore-finger and Thumb, and separates it from all Adhesions, leaving it entire. PETIT inserts a Director, with an Incision Knife, under the Ring of the Abdomen, and makes an Opening in the Manner we have before described: after which, he returns the Intestine gently towards the *Os Ilium*. To prevent a Return of the Disorder, he applies a Bolster or Pellet of compact Lint, dipt in the white of an Egg, shook together with Spirit of Wine, and being expressed, is convoluted in the Hand, before he applies it, in the Form of an Egg. Over that he applies another, which is secured upon the Part by three or four triangular Compresses, each a little larger than the other, moistened with *Sp. Vini*, and firmly secured by the Bandage called *Spica Inguinalis*.

Our Opinion of this Method.

IV. But the preceding Method of Cure, without opening the Sacculus, is not approved of by me nor many other eminent Surgeons: 1st, because the Sacculus sometimes adheres to the spermatic Vessels, from whence it cannot be separated without injuring them. 2^{dly}, Because the prolapsed Omentum or Intestine is frequently suppurated, which can be neither cured nor discovered while the Sacculus is entire: for if the Intestine be corrupted ever so little; if but a black Spot appear in it; or if any ways wounded, it cannot be replaced with Safety. If a large piece of the Intestine be vitiated, it must be cut off; and the Extremities of the sound Parts afterwards closed by a Suture of the Mesentery. 3^{dly}, Because the Sacculus sometimes contains a large Quantity of fetid and ichorous Matter

Matter, which would be this Way returned in the Abdomen, to the great Injury of the Patient. And CHESELDEN observes in his Anatomy, *Edit. 3. Pag. 283.* that he has found above two Pound of fetid Matter in the Sacculus of a Rupture of this Kind; which, according to the preceding Method, would have been doubtless returned into the Abdomen. 4^{thly}, The Intestines or Omentum sometimes adhere to the external Parts, from which they cannot be separated without opening the Sacculus. 5^{thly}, The Sacculus being left entire, may easily occasion a Return of the Disorder. 6^{thly}, And lastly, this Method cannot succeed in those inguinal Ruptures, where the Peritonæum is lacerated. LE DRAN also disapproves of this Method, because he does not find it to be attended with any particular Advantages, and because in incarcerated Ruptures of some Days Continuance, the Intestine may be sphacelated and ignorantly returned in that State; by which Means the Chyle and Fæces would run into the Abdomen, and possibly kill the Patient. He therefore concludes, that the Sacculus should be always opened when the Rupture is incarcerated.

V. D. CYPRIANUS (who was formerly an eminent Physician and Surgeon in *Holland*, but spent the latter Part of his Life in *England*) used to open the Sacculus of the Peritonæum in this Disorder, as we before advised; with this Difference, that instead of a Director he inserted his Finger to guide and defend the Knife in dilating the Wound. When the Ring of the abdominal Muscles was not wide enough to return the Intestine, he inserted a Director, and divided the Skin, Fat, Muscles, and Peritonæum, to dilate the Ring. He then inserted his Finger, and upon that a Pair of Probe Scissars, with which he divided them all, till there was an Opening made large enough to return the Intestine, without any Force: which he approved of, because by pressing the Intestine through a narrow Stricture, it frequently inflames and mortifies. If the Intestines adhered to any of the external Parts, he first carefully separated them with the Scalpel, and closed the Wound by the *Sutura Nodosa*, as in *Gastroraphia*; which Suture is recommended not only by CELSUS but also ROSSETUS, and above a hundred years ago by ROLFINCIUS.

CYPRIANUS's Method of Cure.

VI. CHESELDEN's Method for incarcerated Ruptures of the Intestines or Omentum, is to divide the Integuments, abdominal Muscles, and Peritonæum, by a longitudinal Incision, sufficiently large, and extended into the Aperture, through which they were prolapsed. Then introducing his Fingers into the Wound, he draws in the Intestine; and if any Part of the Omentum adheres, he passes a Needle and double Thread round it, and after tying, amputates it: and thus he has happily restored the Patient. But whether he closes up the Wound by Suture, or any other Method, he does not inform us: yet he has been so particular, as to represent the Case with a Figure. It were to be wished, for the Public good, he had been some what more explicit in his Description of this Operation: tho' he seems in this Practice to have copied after SMALZ, a famous Surgeon: who, as DECKER informs, followed this Method, which he likewise illustrated with an elegant Figure.

CHESELDEN's Method of Cure.

VII. When the Intestine has been returned into the Abdomen, different Methods of Dressings are used agreeable to the different Circumstances of the Case. And here a Pellet of Lint may very properly be applied to the Ring, as at N^o 3; the Remainder of the Wound filled with loose Lint, covered with a Compress, and the Bandage, called *Spica*, not over tight. It is the Practice of some Surgeons

What is to be done after reducing the Rupture.

geons to scarify, or make many small Incisions with the Scalpel or Scissars in the upper Part of the abdominal Ring, in order to render the Cicatrix more firm, and prevent a Relapse of the Disorder. But if this be put in Practice, it should be done with great Caution, to avoid wounding the Intestine. The loose Part of the Sacculus is then tied up with a Ligature near the Ring of the abdominal Muscles, and afterwards cut off below the Ligature, together with so much of the Integuments as are superfluous. The Wound is to be dressed with Pledgits of Lint, and particularly the Pellet of PETIT before-mentioned, to be retained with thick triangular Compresses and the Bandage *Spica*: then bleeding the Patient after the Dressing, when of a full Habit, he may be inclined to rest. During the whole Course of the Cure, the Patient should lie still, with his Head not much elevated: and his Diet should be spare and easy of Digestion, as we have recommended in other Wounds. If the Patient should be loose naturally, laxative Medicines may be used internally: an emollient Clyster should be injected daily. And if the Patient survive the Space of four or five Days after the Operation, we may reasonably suppose him to be out of Danger. If the Intestine is sphacelated, or the Omentum corrupted, or both of them hang out of the Abdomen, you should not apply the Lint Pellet, which would press too much upon the Parts and hinder their cleansing. In this Case the Dressing should be only dry Lint, a Compress and Bandage. If the Inflammation continues in the Intestine, you must have recourse to Bleeding, cooling Clysters, the Bark, and proper Fomentations. In Case of Vomiting, Hiccoughs, and a violent Fever, which threaten instant Death, the most powerful Medicines must be immediately applied, which we have prescribed before on these Occasions.

What is to
be observed
in the after
Dressings.

VIII. After the first Dressing, the Parts should not be undone without urgent Necessity before two or three Days: after which time the Wound may be cleansed of its Sordes with warm Wine or Spirit of Wine, and the Remainder of the Cure performed, as we have directed in other Wounds. But care should be taken at every dressing to let an Assistant compress the upper Part of the Wound, to prevent a Relapse of the Intestine. And when the Wound is healed, if the Patient be young, he should wear a proper Truss for a Year or two: but if an Adult, or old Person, the Truss should be wore during Life.

Concerning
the Use of
Tents after
the Opera-
tion.

IX. Many of the most considerable Surgeons at *Paris*, and others, advise the Use of a large Tent, after the Operation and Reduction of the Intestine: which being made of Lint, of a considerable Length and Thickness, and fastened to a Thread, is to be inserted into the Abdomen, to keep open a Passage for the Vent of such Humours, as are formed in the Cure. WIDENMANNUS and DIONIS direct the Tent to be made about the Length and Thickness of a Finger; and tell us, that it ought not to be extracted, till it falls off of itself by a Suppuration of the Parts. But PETIT condemns the Use of them, as pernicious, by irritating the Parts, and admitting the external Air. Yet I cannot but acquiesce in the Use of them being proper, when there is a repeated Discharge of putrid Humours to be made from the Abdomen, as LE DRAN also thinks: otherwise, it may be sufficient, according to PETIT, to apply a thick Pellet only, for the more speedy Agglutination of the Wound.

What is to
be done
when the

X. If the Omentum appears to be suppurated or enlarged, so that it cannot be rightly replaced in the Operation, a Needle and double Thread is to be

passed

passed round the sound Part, and tied on each Side, and the vitiated Part afterwards to be amputated. The sound is to be returned, and the rest of the Treatment to be made according to the Directions we have given in treating of Wounds of the Abdomen, with a Suppuration of the Omentum. But if the prolapsed Intestine itself be found mortified or suppurated, as sometimes happens, when the Operation has been too long delayed, the Patient is then in the utmost Danger, but should not be deserted by the Surgeon, as being incapable of any Assistance. He should rather cut off the mortified from the sound Part of the Intestine, and stitch the latter to the Margin of the Wound in the Abdomen, as we before advised in *Part I. Book I. Chap. VII.* by which Means many have been known to survive the Disorder, and regain their former Health. We are encouraged in this Practice, not only by the Experience of ourselves, and others, supported by the Testimonies mentioned in the Place now quoted; but we are also told by MERIUS, that a Man was happily cured, who had four or five Foot of his Intestine cut off, which was mortified in this kind of Rupture, and the sound Part joined to the Lips of the Wound in the abdominal Muscles. GARENGEOT also mentions a Man, whose Intestine being mortified and returned by the Surgeon, in that Condition, into the Abdomen. He had soon after a Discharge of his Excrement by the Wound: and a Month afterwards the Flux by the Wound not only lessened, but the Lips of the Wound itself being stopped with a Pellet, and tied with a Thread, gradually healed in such a Manner that by untying the same when there was Occasion, the Man survived, and had the natural Function of the Parts performed as usual, with but little more Trouble.

Intestine or
Omentum is
suppurated.

XI. LE DRAN observes, that it is a common Calamity among poor People, who have had the Misfortune of an incarcerated Rupture, to mistake it for an Abscess, and to treat it accordingly, without calling in the Assistance of any Physician or Surgeon. By which Means they bring the Part to Suppuration, after intolerable Pains; and upon its discharging Fæces or Worms, which I have sometimes observed, then they implore the Help of the Surgeon. These, he says, generally require nothing more than the Ulcer to be cleansed daily, and treated with some vulnerary Medicine, covered with a Plaster of the same Kind: by which Means many such Patients have been recovered, more by Nature than Art, the Wound healing up; or, in some, leaving an Aperture in the Groin, through which the Fæces are discharged, and sometimes Worms, as it were by a new Anus. In Imitation of Nature, therefore LE DRAN (*Obs. 60*) does not return the suppurated Intestine into the Abdomen; nor does he amputate it; but only dilates the narrow Wound of the Abdomen, that the Blood, Sordes, and suppurated Parts of the Intestine may have a free Discharge; and thus he waits a spontaneous Agglutination of the Intestine with the Ring of the Abdomen. But if the Surgeon should have injured the sound Intestine in the Operation, he then thinks it necessary to stitch the Intestine to the Lips of the Wound, which inflaming, with more intimately unite with each other.

LE DRAN's
Method,
when the
Intestine is
mortified.

XII. That the Parts will thus agglutinate or join together, is confirmed by a late Observation of RAMDOHRIUS, present Surgeon to his serene Highness the Duke of Brunswick. He some Years ago cut off a large Part of a mortified Intestine in a Woman, that had an incarcerated Rupture, which broke of itself; and joining the two sound Parts of the Intestine together, he inserted one into

A remarkable
Observation
of
RAMDOH-
RIUS.

into the other, and tied them together loosely with a String; and replacing them in the Abdomen, drew them by the String to the Mouth of the Wound; by which Means the divided Intestine inflamed, and surprizingly united. The Woman discharging her Fæces afterwards, not through the Wound, but by the Anus, as before. The Woman afterwards lived in a State of Health; till in about a Year's Time she died of a Pleurisy. Upon opening her, the divided Intestines appeared to be united with each other; of which he made a present to me, together with Part of the Abdomen, to which they adhered. I now keep them in Spirits, to convince such as are incredulous, and of a different Opinion.

What should
be done in
the Oschio-
cele incar-
cerata.

XIII. If the Intestine should be prolapsed into the Scrotum, and so contorted or intercepted, that it cannot be reduced or returned into the Abdomen; the Surgeon will be then also obliged to make use of the Operation in the Manner we have before related, and as we shall hereafter more fully explain. The Reader may be furnished with more useful Observations upon this Subject, in SAVIARD, *Obs. Chir.* 19. and 20. COURTIAL, *Obs. Pag.* 150. also in LE DRAN, *Obs. Chir.* and three other Dissertations or Descriptions of Cases in *Commerc. Litterar. Norimb. Ann.* 1735. *Pag.* 3. by WERLHOF, Physician to the King of Great Britain, which are very learned, and worthy of the Reader's Perusal.

C H A P. CXVIII.

Of the *Hernia femoralis*, or *crural* RUPTURE.

Crural Ruptures described.

I. **R**ELATED in Appearance to the *Hernia Inguinalis* is the *crural* Rupture, observed, and so named by our modern Physicians. I rather call it *Femoral*, as it is formed by a Prolapsion of the Intestine beneath the Integuments of the anterior or interior Part of the Thigh near the Groin, where the *crural* Artery and Vein pass out of the Abdomen. Though this Disorder is not unfrequently met with, especially in the weaker Sex; it is a little surprizing, that it should have been considered by so few, and with so little Accuracy, insomuch that many have made no Distinction between this and the *Hernia Inguinalis*. VERHEYEN is the first that has wrote of this kind of Rupture; though BARBETT seems to have hinted at it obscurely before him. After VERHEYEN, the Disorder was explained more at large by PALFYN, and after by GARENGEOT and Dr. FRIEND, COCHUIS and LE DRAN. Indeed GARENGEOT tells us, that the Disorder was known to the Ancients, and particulary PAULUS, but without mentioning the Place where: and for my own Part, I can find nothing upon the Subject in that Author. And the Words, which he attributes to BARBETT in the same Place, I cannot find in any Part of that Author's Chapter upon Ruptures.

Nature of the Disorder.

II. The Seat of this kind of Rupture is agreed on by Anatomists to be in a small Cavity of the Thigh, between the *iliacus* and *psoas* Muscles under the *Sartorius*, where the *crural* Artery and Vein pass from the Abdomen into the Thigh: in which Part the *Peritonæum* may be easily distended, being very loosely guarded before by the Tendons of the abdominal Muscles, and secured

at

at bottom by nothing but a little Fat, and the cellular Membrane, which may be more easily dilated than the Rings of the Abdomen, as it is subject to a perpendicular Pressure in our erect Posture. If we examine the *Os Ilium* in a Skeleton, we find a small circular Excavation in its anterior Part above the *Acetabulum*; over which is extended the lower Part of the Tendon of the oblique descending Muscle, like a String over the Arch of a Bow, which, being intermixed with some tough ligamentary Fibres, forms what Anatomists call the *Ligamentum Vesalii* or *Poupartii*. This is the small Arch or Cavity, through which the Intestines, and sometimes the Omentum are prolapsed in the crural Rupture. GARENGEOT says, this Rupture occurs more frequently than any other: but though I have seen and cured a great Number of all Kinds, I never met with above one or two of the crural Species.

III. Though there is a near Resemblance between the inguinal and crural Rupture; yet if the Surgeon accurately observes the Parts occupied by each, he will, without much Difficulty, perceived their manifest Difference. For the inguinal Rupture is seated nearer the *Regio Pubis*, in that Part where the Processes of the Peritonæum pass through the Rings of the Abdomen, and accompany the spermatic Vessels into the *Scrotum*; the Tumor extending itself from the Ring down to the *Scrotum*. Whereas the crural Rupture is seated more to the Outside of the *Inguen*, in the upper and anterior Part of the Thigh above the *Acetabulum*: the Crural is also usually smaller, rounder, and deeper, than the Inguinal, which is more oval or oblong. Lastly, as this Disorder has not yet gained a Name in *Germany*, it may be not improperly ranked under the *Hernia Inguinalis*; which may be reckoned of two Kinds, *interior* and *exterior*, the latter being the crural Rupture. Diagnosis.

IV. The Consequences and Treatment of the crural Rupture may be in a great Measure understood, from what we have before said concerning the *Hernia Inguinalis*, though Patients afflicted with the crural Rupture are sometimes in more Danger than in the other, from the Narrowness of the Aperture. It is to be also observed, that to reduce the prolapsed Intestine of the crural Rupture, it should be pressed more towards the *Linea Alba* inward, and not towards the *Os Ilium* outward, as in the *Hernia Inguinalis*. If the Intestine can be returned with the Hand in the crural Rupture, it may be sufficient only to apply a Plaster, Compress, and Bandage, as in the *Hernia Inguinalis*. Prognosis and Cure.

V. But when the Intestine is incarcerated or intercepted, in such a manner, that it can receive no Benefit from the Use of Oils, Ointments, Cataplasms, and Clysters, especially that of the Smoak of Tobacco; it will be necessary to proceed to the Operation, as we direct in the *Bubonocèle*. The Sacculus of the Peritonæum being laid bare, the Foramen, through which the Intestine prolapsed, should be a little dilated, but so as not to injure the Sacculus, if the Disorder be recent, as PETIT advises. Then the Intestine or Omentum is to be gently protruded into the Abdomen, which may be usually done without much Difficulty, as it is generally but a small Part, or an *Appendicula* of the Intestine, that forms the Tumor, as VERHEYEN rightly observes in his Anatomy, Cap. DE PERITONÆO. When the Rupture is reduced, the Wound made in the Operation is to be healed like that in the *Bubonocèle*.

VI. But if a large Part of the Intestine falls down, and adheres to some of the adjacent Parts, so that it cannot be returned without dividing the Sacculus; or when the Intestine may be reasonably supposed to be suppurated from a long Neglect of the Disorder; the Sacculus of the Peritonæum should then be carefully incised, the Intestine freed and returned when sound, as we directed in the preceding Chapter. But great Caution should be used not to injure the subjacent crural Artery or Vein, which might instantly endanger the Patient's Life. And lastly, if the Omentum is prolapsed in this Rupture, and it or the Intestine vitiated, the unsound Parts may be amputated, and the rest treated as in the preceding Chapter.

C H A P. CXIX.

Of the Oscheocele, or Hernia of the Scrotum, and particularly of the ENTEROCELE, or Prolapsus of the Intestine into the Scrotum.

Description
and Kinds
of the Os-
cheocele.

I. **W**E have hitherto described those Ruptures, which happen in the superior Part of the Abdomen. We now proceed to those, which arise from the same Causes in the Scrotum. A Rupture in this Part is generally termed by Physicians and Surgeons an Oscheocele, or Hernia Scrotalis: of which there are two Kinds; the true, from a Prolapsion of the Intestine or Omentum; and the spurious, or only apparent, from a Tumor of the Testicles or spermatic Vessels, or a Distention with Air, Water, or some offending Humour. The Oscheocele is therefore distinguished into various Kinds, according to the different Substance, with which the Scrotum is distended, by which it is also differently denominated. When the Intestine is prolapsed, through the Process of the Peritonæum into the Scrotum, the Tumor is then called Enterocele; if from the Omentum, Epiplocele; if from a Distention with Water, Hydrocele; from Wind or Flatus, Pneumatocele; when from Blood, Hæmatocele; from Fat, Liparoccele. If the Testicle is enlarged beyond its proper Dimensions, it is termed Sarcoccele; and when the spermatic Veins are too much distended, it is termed Varicoccele, Circoccele, or Hernia Varicosa. When an Abscess is formed in the Scrotum, it is by some termed *Hernia Humoralis*. Sometimes two or more of these Substances concur together to form the Tumor, which is then named conjunctly from them, Entero-epiplocele, or Hydro enteroccele, &c. Sometimes a Hydrocele is in one Side of the Scrotum, while an Enteroccele occupies the other, as I lately observed: and so of the rest.

Of the ENTEROCELE.

Enteroccele
described.

II. An Enteroccele is defined by Physicians, to be a Tumor formed by a Prolapsion of the Intestines through the Rings of the Abdomen and Processes of the Peritonæum into the Scrotum. See *Tab. XXV. Fig. 3. AB.* It is sometimes termed an *Oscheocele*, and compleat Hernia, in Contradistinction to the *Bubonoccele*, which is an imperfect Hernia, the Intestine not extending into the Scrotum. The Disorder always arises from a violent Distention of the Peritonæum

næum and Rings of the abdominal Muscles, through which the Intestine prolapses into the Scrotum (see *Tab. XXV. Fig. 4. D*) the Peritonæum being dilated into a Sacculus, including the Intestine oftner than ruptured, so as to let the Intestine thro' into the Scrotum. But the Peritonæum is sometimes Ruptured, as ÆGINETA observes, *Lib. VI. Cap. 65*. This Rupture is always attended with Pains, and usually happens but of one Side, never in both at a Time. Sometimes only the Intestines fall down; at other Times it is accompanied with the Omentum.

III. This kind of Rupture, like the Exomphalos and Bubonocèle, usually proceeds from some Violence, by a Fall, Blow, or straining to Leap, lifting great Weights, Vomiting, &c. and according to the Nature of the Cause the Rupture is formed, either instantly, or imperceptibly by Degrees. The Tumor appears soft to the Touch, like an Intestine or Bladder distended with Wind: It first appears small in the Inguen, and gradually descends down to the Testicle of the same Side in the Scrotum, which is thereby sometimes distended half way down the Thigh, or even to the Knee. The other Symptoms of this Rupture are the same with those of the Bubonocèle before described: A soft Tumor appears extended from the Ring of the abdominal Muscles down to the Scrotum, near the Testicle, from which it may generally be distinguished by the Touch. When the Disorder is but slight and without Inflammation, it is sometimes diminished or augmented at Intervals; especially when the Patient lies down, the Intestine returns into the Abdomen of itself, or with a gentle Pressure of the Hand, making a Sort of murmuring Noise: but upon the Patient's arising, or removing the Hand, it again returns with the like Noise. The Tumor is also increased by crying, plentiful eating, and lifting or carrying Burthens: it is likewise contracted with Cold, and dilated with Heat. Sometimes the prolapsed Intestine is inflamed, greatly distended with Fæces, or adheres to the adjacent Parts; by which Means it is rendered incapable of returning into the Abdomen. The Enterocèle may generally be distinguished from the Hydrocèle or Pneumatocèle, by its returning into the Abdomen with a murmuring Noise. The Patient is sometimes troubled with cholicky Pains, more or less violent in the Abdomen, Inguen, and Scrotum, with a Nausea and Vomiting, especially in the *Oscœocèle incarcerata*. When this Rupture comes on violently and on a sudden, the Ring of the Abdominal Muscles is generally so contracted, that the Intestines cannot be returned through it: in this Case it almost always degenerates into the incarcerated Hernia.

Causes and
Signs of the
Enterocèle.

IV. This kind of Rupture may be sustained with but little Inconvenience, by Men not much addicted to hard Labour, and Women with Child: but it should never be left to itself, without a Support or Truss, lest by some Accident the Intestines should become incarcerated, and incapable of being returned. And indeed, without these Assistances, there is great Danger: for from Falls, Blows, coughing, sneezing, lifting great Weights, vomiting, &c. the Intestines are often forced down further, and produce the Hernia incarcerated, with all its terrible Symptoms, terminating at last in Death itself; as described in the Chapter *de Omphacèle & Bubonocèle*. When the Disorder is recent, and in a young Subject, it may be perfectly cured without Danger of a Relapse: as it may also in Adults, and old People, by constantly wearing a proper Truss.

Prognosis.

It is to be also observed, that there is less Danger in those Ruptures, where the Intestine is accompanied with the Omentum, than in such as have a Prolapsion of the Intestine without the Omentum.

Method of
Cure in the
Enteroccele.

V. When the Rupture is not yet become incarcerated, but the Intestine is returnable without any Adhesions, the Surgeon should immediately proceed to reduce the Parts, and retain them in their proper Situation, and to close up the Aperture firmly with a Truss, Bandage; or attempt the Cure by Incision, termed Celotomia. The Method which some boast of, and pronounce effectual, of treating these Ruptures with Ointments and Plasters, and other Medicines without the Use of a Truss, is to me vain and frivolous, at least very uncertain. The main of the Cure therefore, in a recent Enteroccele, depends upon the Application of a proper Bandage, as we have described in the Bubonoccele *Chap.* CXVI. N^o 6. *Tab.* XXV.) which, with the Assistance of proper Internals, Externals, and Diet, seldom fails to succeed in Adults, as well as in Infants and Children^a.

Of Castration in the
Enteroccele.

VI. I cannot help condemning in this Place the base and common Practice of some Medicafters, who having tied up the spermatic Vessels and Process of the Peritonæum, castrate the Patient in this Disorder without any Manner of Necessity, and thereby torture the Patient, and endanger his Life. Such pernicious Practices ought to be corrected with Severity by the Civil Magistrate, especially as it is not a Preservative against a Relapse of the Disorder, which is confirmed not only by my own Experience, but also the Authority of CELSUS and CYPRIANUS. This kind of Ruture should therefore be reduced, and the Parts secured with a Truss, without tormenting the Patient with Incision or Castration. More may be seen upon this Subject in our Dissertation, upon removing the Abuse of Celotomia, *Helmstadt, Ann.* 1728.

Trusses proper for the
Enteroccele.

VII. The best Trusses for this Disorder are those, which compress the Part, so as to prevent a Relapse of the Intestines. Of those there are a great Variety, contrived in various Shapes, for a Rupture, not only on one Side, but on both: the best of which are exhibited in *Tab.* XXV. *Fig.* 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. They may be made of various Materials. But the smaller, for Infants, should be composed of soft Leather, or lined with Callico, stuffed with Cotton: the stronger and larger Trusses may be composed of steel or strong Leather. These are to be applied so, as to compress the Orifice of the Rupture, which will probably unite soon after, and prevent a Relapse of the Disorder. But the Patient should not leave them off, for at least the Space of half a Year: during which time, and ever after, he should use a spare Diet, and avoid Strainings of all Kinds, violent Exercise, Riding, Vomits. And constantly use laxative Medicines, as there may be occasion; lest by a too violent Pressure of the abdominal Muscles the Intestines should be again forced down. By this Means the Rupture may be cured, even in those who are

^a About the End of the last Century, there was one PRIOR DE CABRIER in *France*, who boasted himself possessed of a secret Medicine, by which all Ruptures were curable, without the Operation, or any Trusses. This Arcanum was purchased of him by the *French King* *Levis* XIV, at a high Rate, who afterwards made it public for the common Good: when it appeared to be nothing but *Sp. Salis*, to be taken in a certain Quantity, every Day, in Red Wine, for a considerable Time; but to no Purpose, without a Truss, *Vide* VERDUC on Bandages, and DIONIS, *Surg. Chap.* on Ruptures.

above thirty (if the Disorder be recent, and the Surgeon's Assistance timely called in) without any Use of the Knife, which would be here more pernicious than serviceable.

VIII. Another Method of reducing the Enterocoele is by Celotomy, or Incision before mentioned: which is often practised by Mountebanks, generally deprived the Patient of his Testicle in the Operation. But it is condemned by all prudent Surgeons, upon many Accounts; especially as it deprives them of a most necessary Organ, by a dangerous and excruciating Operation, without any Advantage. Not but that it is necessary to make an Incision through the Integuments, to return the Intestine, when it cannot be reduced by any other Means.

Celotomy
described.

IX. The Patient is first laid upon a Table, with his Head inclined backward, his Hips elevated, and all his Limbs and Head secured from moving, by fastening them with Ligatures to the Table, or by holding with the Hands of Assistants. The Operator then protrudes the Intestine into the Abdomen; after which an Assistant compresses the ruptured Part, or dilated Ring, with his Hand. The anterior Part of the Scrotum of the affected Side is then elevated, and opened by a longitudinal Incision: the Sides of the Wound are dilated, so as to discover the Process of the Peritonæum, which is then separated, together with the Testicle, from the Adjacent Parts by the Fingers, and taken out of the Scrotum, to the great Torment of the Patient. The distended Part of the Process of the Peritonæum is then drawn down, and firmly tied together with the spermatic Vessels, by a silk Ligature: but others divide the spermatic Vessels first, and then separate the Scrotum from the Testicle, which they conceal in one Hand from the Eyes of the Assistants. The Part is then dressed with Lint, Plaster, Compress, and Bandage, and dressed the following Days with *Ol. Ovar. Hyperici*, or some other vulnerary Balsam; till the Ligature, which tied the Process of the Peritonæum, and spermatic Vessels, is digested off, which usually happens six or seven Days after the Operation. The rest of the Cure being perfected, as in other Wounds. And thus the Patient either recovers, or dies of a Fever and Convulsions, from the Severity of the Operation. Yet there is a more severe Method extant in the Writings of FABRICIUS AB AQUAPENDENTE and SCULTETUS, practised in *Italy*; by which the Process of the Peritonæum is first tied, by passing a Needle and strong wax'd Thread round it; after which they cut off the Testicle, and apply an actual Cautery to the spermatic Vessels.

The Method of
Performing
Celotomy,
used by
Mountebanks.

X. Another Method called the Puncture, and accurately described by PAREY and GEIGER, consists chiefly in passing a small gold Wire round the upper Part of the Process of the Peritonæum near the Ring of the abdominal Muscles; leaving the Testicle in its natural Position. The gold Wire is twisted by a Pair of Forceps, so as to confine the Process of the Peritonæum, without compressing the spermatic Vessels, in order to prevent the Intestine from falling through it again. But this Operation seems to me useless, and incapable of succeeding. For if the Wire is not drawn close, the Intestine will easily protrude it down, and dilate the Process as before: but if it be drawn close, the spermatic Vessels will be compressed, and consequently the Testicle will mortify. Nor is it possible to conceive how the Wound can heal, but will rather be a continual Ulcer, from the constant Irritation of the Wire in.

Method of
Cure with
gold Wire.

the

the Wound : upon which account it has been deservedly treated with Neglect by all prudent Surgeons.

LITTLE
JOHN'S Me-
thod.

XI. I had lately an Account sent me from *England* by Mr. JOHN DOUGLAS, of a Physician, there named LITTLE JOHN, whose Operation in this Disorder differed from others, in applying Oil of Vitriol, or other strong Caustics. After the Rupture is reduced, he applies the Caustic above the *Os Pubis*, in such a Quantity, as may quickly eat through the Skin ; for the larger Eschar it made, the more effectual and useful it would prove. For this Reason, the Application was repeated for two or three Days, that it might the more effectually corrode the Skin, removing the old Eschar, every Time, before the Application of the Oil of Vitriol, that it might the more effectually penetrate. The Eschar was then dressed with a Plaster of *Oxycroc.* & *Paracels.* mixed in equal Parts, and spread upon Leather, retained with Compresses and Bandage ; the Use of which Plaster was to separate the Eschar, in order to cure the Ulcer. If any luxuriant or spongy Flesh appeared, he directed it to be taken down with *Lap. Infernalis* ; keeping the Patient to a spare Diet, without the least Exercise, till the Wound was cured. After this the *Empl. ad Herniam* was applied to the Cicatrix, and secured by a proper Bandage, which the Patient continued to wear, till the Resistance of the Cicatrix was sufficient to prevent a Relapse of the Disorder. He had five thousand Pounds given him for the Discovery of this Method by King *George I.* notwithstanding which, it quickly became contemptible, and in disuse among most of the *English* Surgeons. See *Houston's History of Ruptures*, and *DOUGLAS's Syllabus of chirurgical Operations*.

Another
Method by
SERME-
CIUS.

XII. SERMECIUS, in his Treatise of Lithotomy, mentions another much better Method of curing Ruptures, without the loss of the Testicle, which he learnt among the *Russians*. A longitudinal Incision was first made in the Inguen ; and the Process of the Peritonæum, containing the Intestine, was then freed from the Parts : after returning the Intestine and drawing the Saccus strongly out of the Wound, it was tied with a strong Thread, as near as possible to the abdominal Muscles (see *Tab. XXV. Fig. 4. BB.*) The Ligature was then left hanging out of the Wound, which was dressed in the usual Manner, till it digested off of itself. By this Method, he assures us, many have been cured, without Injury to the Testicle or spermatic Vessels. This Method is by SERMECIUS recommended, as of the greatest Use in Adults, where the Intestine cannot be retained in the Abdomen by Bandage. I have some Time since received a Treatise from an *Helvetian*, whose Name is FREITAGE ; in which he mentions this Method, and says it was practised often by his Father with great Success, as described by SERMECIUS : with this Difference only, that he perforated the Saccus with a Needle and Thread before he tied it up. This is a very useful and necessary Caution, to prevent the Ligature's slipping.

Another
Method by
sacrifying
the Ring of
the Abdo-
men.

XIII. In order to preserve the Testicle, some Surgeons do not tie the Process of the Peritonæum and spermatic Vessels with a Ligature : but having returned the Intestines and Omentum, they then scarify the Ring of the Abdomen or Aperture, through which the Intestine prolapsed, together with the Skin, in order to render the Cicatrix more firm. By which Means, many have been cured of these Ruptures ; especially if they continue to wear a proper Bandage for

for a considerable Time afterwards. But I think the Operation may succeed better in Infants than in Adults.

XIV. If in the Enterocoele the Intestine cannot be reduced, especially if it adhere to the Process of the Peritonæum, Ring of the abdominal Muscles, Scrotum, or Testicle, the Patient being afflicted with the iliac Passion, and other Symptoms in that Case; no Truss or Bandage will be of any Service, but rather increase the Inflammation, Pain, and other bad Symptoms. There is then but one Method of saving the Patient, by a severe Operation. In order to which the Patient is to be placed, and the Integuments divided, as we before directed, in N^o 8. and in *Chap. CXVI. N^o 2. & seq.* And when the Sacculus appears, it is to be carefully separated, and a small Aperture made in it big enough to introduce a Quill, or some such other Instrument, to separate the Intestine from all its Adhesions, before it is protruded into the Abdomen: which should be always done in the Enterocoele incarcerata, when the Intestine adheres. Then the Wound is to be healed, and the Patient secured from a Relapse, by continual wearing the Bandage *Spica*. But if there be no Adhesion to the neighbouring Parts, no iliac Passion or other bad Symptoms, I would by no means advise this dangerous Operation: but recommend a simple Bandage, to suspend the Rupture.

What is to be done when the Intestines are not returnable by adhering.

XV. If the Stricture of the Intestine is so great, as to render all Means ineffectual to reduce the Rupture, especially Bleeding, Cataplasms, Clysters, and particularly the Clyisma Fumosum of Tobacco; the Surgeon must then have Recourse to the Knife, to save the Patient, as we before proposed in the Bubonocoele incarcerata, *Chap. CXVI.* The better to illustrate and explain this difficult Operation to our Reader, we have supplied him with Figures, *Tab. XXVI. Fig. 1, 2, 3.* from the Treatise of incarcerated Ruptures of the Scrotum by MAUCHART, before recommended by us; which we shall consider more at large in the Explanation; and at present conclude with the following necessary Observations.

Method of treating the Enterocoele incarcerata.

XVI. 1st, When the Rupture is not attended with bad Symptoms, but is reducible, without any Division of the Sacculus; in that Case, the Integuments are to be divided, in such a Manner, that the Sacculus may be distinctly viewed. After which, the prolapsed Intestine may be returned into the Abdomen, without much Difficulty, and the Remainder of the Cure performed, as we have directed in the Bubonocoele, *Chap. CXVI. N^o 2.* But 2^{dly}, when the Rupture is of a worse Kind, or when the Omentum or Intestine adheres, and a large Quantity of some Humour contained in the Sacculus; then the preceding Method is not so convenient: but the Sacculus should be divided, and the Intestine carefully returned. But if its Return should be obstructed by a Stricture at the Ring of the abdominal Muscles, that Stricture should be first dilated by Incision; and after freeing the Intestine or Omentum from all its Adhesions, they may be returned as before. But the Intestine should be treated so tenderly, as rather to divide the Part, to which it adheres, even if it be the Testicle itself, than injure its own proper Coats. In the next Place, the Sacculus.

Necessary Observations in the Enterocoele.

* Some are for extirpating the Testicle, when it adheres to the Intestine; but I rather approve of cutting off a small Portion only, as a Wound of the Testicle will heal. GARENGEOT says, he has found the prolapsed Intestine and the Testicle confused together in one Sacculus; which must be very rare, being hardly ever observed by others, because the Testicle is included in a Sacculus of its own.

of the Peritonæum is to be freed from all its Parts, and secured by a Ligature, tied round near the Ring of the abdominal Muscles, made of a flaxen Thread waxed, and three or four Times doubled: after which, that part of the Sacculus below the Ligature is to be extirpated, and the Wound dressed as before. When the Ligature is digested off, it forms a Sort of Tubercle or hard Cicatrix; which being joined by Scarification to the Lips of the Wound, firmly resists the Pressure of the Intestine, and prevents it from subsiding into the Scrotum: but in the mean Time, the Surgeon should be careful not to pass the Ligature round the spermatic Vessels. If 3^{dly}, one of the epigastric Arteries should be divided in the Operation, it should be immediately taken up with a Needle and Thread, or compressed by an Assistant, till the Operation is over. But 4^{thly}, if the prolapsed Intestine is distended with Wind or Fæces, so that it cannot be returned, its Contents should then be gradually protruded into the neighbouring Parts extracted gently from the Abdomen; by which Means the flaccid Intestine will more easily return. But I should rather approve of dilating the Stricture by Incision, when necessary than endanger a Contusion, by forcing it through an Aperture too strict; proceeding afterwards, as we have directed in the Bubonocèle incarcerata, Chap. CXVI. 5^{thly}, If the Mesentery should also accompany the Intestine in the Rupture, it should, according to the Observation of PETIT, be returned first: but if the Omentum accompanies it, then the Intestine should be returned first, and the Omentum last. 6^{thly}, If the Intestine should happen to be wounded in dividing the Sacculus, it should be joined together by the knotted Suture, and fastened by the Thread to the Wound of the Abdomen, and afterwards treated according to our Directions in Wounds of the Intestines. 7^{thly}, If the Intestine should be sphacelated or mortified, the dead Part is to be cut off, and the Sound stitched to the Margin of the Wound: or, according to LE DRAN, the corrupted Part may be left uncut, dressed with a digestive Ointment, Lint, and Compresses; by which Method it will gradually waste and drop of its own accord: and the Wound is afterwards to be healed with a vulnerary Balsam, as in a Bubonocèle. 8^{thly}, If Part of the Bladder should come through the Ring of the abdominal Muscles, as it sometimes does in gravid Women, that should be first returned before the Intestine. 9^{thly}, The superfluous Parts of the Integument in the Scrotum may be cut off, to render the Cicatrix stronger and more uniform. Lastly and 10^{thly}, the Scrotum and Parts affected are to be defended with Compresses, and secured by the Bandage Spica, or some other, for the same Purpose.

C H A P. CXX.

Of the EPIPLOCELE, or Prolapsus of the Omentum into the Scrotum.

*Epiplocele
described.*

I. **A**N *Epiplocele* is here, that Species of Rupture, in which the Omentum subsides into the Scrotum. This Rupture is not so easily discoverable as the Enterocèle: but it always shews itself by a soft Inequality or Tumor, which increases a little upon straining or contracting the abdominal Muscles
Upon

Upon pressing it with the Fingers there is no murmuring Noise made, as in the Enterocèle; and the Resistance of it is also different. Sometimes the Omentum may be returned into the Abdomen without Difficulty, in this Rupture; and sometimes it adheres so strictly to the adjacent Parts, or is so much enlarged, that a Reduction of the Tumor can be by no Means effected: Both which I observed in opening a male Subject after Death^a. Though there are some who deny, or at least question, the Existence of these Ruptures; for which they may have some Reason, as the Disease seldom occurs, according to the Observation of VESALIUS^b. Nor is the *Epiplocele* ever so large or dangerous as the *Enterocèle*; being, for the Generality, attended with no bad Symptoms, and often tolerable, during the Life of the Patient, without any Assistance from the Surgeon. The Reason why this Rupture so seldom happens, is, from the Shortness of the Omentum in most Subjects, which Anatomy assures us is but seldom long enough to reach (and consequently cannot subside into) the Processes of the Peritonæum. Sometimes a Tumor or Enlargement of the *Membrana Adiposa* in the lower Part of the Abdomen has been mistaken by Physicians and Surgeons for an *Epiplocele*, or an *Enterocèle*. At other Times the true *Epiplocele* has been attended with the same Signs and malignant Symptoms as the *Enterocèle incarcerata*, so as to make the Operation absolutely necessary: in which nothing appeared to the Surgeon but the prolapsed Omentum, as we read in the chirurgical Writings of RUYSCH, DIONIS, and GARENGEOT, on this Disorder.

II. The Cure of an *Epiplocele* consists principally in a Reduction of the Tumor, by returning the Omentum again into the Abdomen; and in securing the Parts from a Relapse, by a Truss or Bandage, as in the *Hernia Inguinalis* and *Scrotalis*. If the Omentum cannot be returned into the Abdomen, and the Patient, notwithstanding, has little or no Uneasiness; it seems better to leave the Disorder to itself, than cure it by the Operation, which is a Remedy worse than the Disease: But when the prolapsed Omentum is much enlarged, inflamed, or attended with great Pain, Fever, and Vomiting, as is usual in the *Enterocèle incarcerata*; the Surgeon should then hasten to the Operation without further Delay, as we have directed in the *Hernia Inguinalis* and *Scrotalis incarcerata*. Care should be taken in the Operation not to return any Part of the Omentum, which is corrupted: but after tying it with a Ligature, let it be cut off from the Sound, as we before advised in Wounds of the Abdomen^c. Or if the Surgeon pleases, he may wait a spontaneous Separation or casting off the mortified from the sound Parts, without a Ligature. It may be worth the Reader's while to peruse the Observations of LE DRAN on this Disorder, II. Obs. 63. & seq.

Cure of the
Epiplocele.

III. Sometimes the Intestine falls down together with the Omentum, which denominates the Rupture an *Entero-epiplocele*; but is hardly distinguishable from the simple *Enterocèle*. Nor does it much signify whether it be distinguished or not; since the Symptoms and Method of Cure are the same in both. But

Method of
treating the
Entero-
epiplocele.

^a This Case is described by me in *Ephem. Nat. Cur. Cent. V. Obs. 85. Pag. 164.*

De Corporis Humani Fabrica, Lib. V. Cap. 4.

^c GARENGEOT, though he rejects passing a Ligature above the unsound Part of the Omentum in Wounds of the Abdomen, yet approves of it in the Operation for Ruptures, *Pag. 337. Edit. II.*

if Part of the Tumor subsides, or returns into the Abdomen, and leaves a soft resisting Substance behind; it is probable, that the Omentum accompanies the Intestine: And then the Case is usually not so dangerous, as when the Intestine prolapses alone: because the soft and fat Substance of the Omentum prevents the Rings of the abdominal Muscles from making so intense a Stricture on the Intestine. The cure consists chiefly in returning the Intestine and Omentum into the Abdomen, with or without the Operation, healing the Wound, and securing the Parts as we have before directed in the *Enterocoele*.

Hernia Vesicæ.

IV. The Bladder sometimes prolapses through the Ring of the abdominal Muscles, and sometimes Part of it descends into the Scrotum, in gravid Patients, or those that have the Stranguary: though there are Instances of it, without either of these Causes. It is called a Rupture of the Bladder or *Cystocoele*. It is known by the Softness of the Swelling, a frequent Stimulus of Urine attended with great Difficulty; which is lessened either by elevating the Tumor, or gently compressing it. It generally decreases on the Evacuation of Urine. For the Cure of this Disorder, that Part of the Bladder, which is prolapsed, must be returned in the same Manner as we directed for the Intestines, and then retained in its Place by a proper Bandage.

Hernia Pubis.

V. The Rupture *ad Offa Pubis* is known by a Swelling round the Foramen Magnum; which either returns voluntarily, or is easily replaced by the Pressure of the Fingers, when the Patient lies on his Back and the Intestines are free. When it is returned, the Treatment should proceed as we directed above in the *Bubonocoele*, Chap. CXVI. If it prove incarcerated, I refer you to the same Method as in *Bubonocoele incarcerata*, Chap. CXVII. But you must take great Care not to wound the Artery that passes through the Foramen Ovale, for fear of a violent and dangerous Hæmorrhage.

Hernia Vaginæ Uteri.

VI. The *Hernia Vaginæ Uteri* is by the Moderns acknowledged to be the same as the *Prolapsus Uteri*, consisting in a Relaxation of the Vagina. This Rupture is protruded from the Intestines into the Cavity of the Vagina; and is very troublesome to the Patient. That the Intestines are enclosed in this Tumor or *Sacculus*, is discovered by the Fingers; by whose Assistance they are returned into the Abdomen. The Cure is performed by a proper Pessary; such as I have represented (for the *Prolapsus Uteri*) Plate XXXIV. Fig. 6, 7, 8, 9, 10, 11. Or by a Sponge, adapted to the Purpose, of a Cylindrical Form. As this *Vaginæ Prolapsus*, so likewise the *Inversio Uteri in Partu* is a Species of the Rupture in which the Intestines are inclosed: Of the Danger of which, and its difficult Cure, see further, Chap. CLVII. Sect. V.

C H A P. CXXI.

Of spurious Ruptures, and first of the SARCOCELE, and CASTRATION.

Sarcocele described.

I. **S**PURIOUS Ruptures are those Tumors formed in the Scrotum, not from a Prolapsion of the Intestines or Omentum out of the Abdomen, but a Collection of Humours, a Scirrhusity of the Testicle or a Dilatation of its spermatic Vessels: and a *Sarcocele* in particular is, when the Testicle is considerably tumified and indurated, like a Scirrhus; or much enlarged by a fleshy Excre-

cence,

cence, which is frequently attended with acute Pains, and sometimes Ulceration, so as to degenerate at last into a true cancerous Disposition: which has several Times happened within my own Observation. Both these Kinds of the Sarcocoele are very different from an Inflammation of the Testicle, as they advance but slowly, and are, in their first Stage, attended with little or no Pain: whereas a *Pblegmon* of the Testicle begins with intense Heat and Pain, and quickly terminates as in other Inflammations. Nor does the Sarcocoele proceed usually from one and the same Cause. But when the Tumor of the Testicle is accompanied with Hardness, the Causes are much the same with those before-mentioned, in a Scirrhus (*Part I. Book IV. Chap. XVII.*) When the Testicle is enlarged by a Kind of fleshy Excrescence, then the Cause of the Disorder is usually some Contusion, or other external Violence. But I remember a Patient, who had a Sarcocoele of this Kind, and could not recollect that he had received any such external Injury. The Sarcocoele differs as to its *magnitude*, being frequently no larger than a Hen's Egg: though I have cured some Patients, in which the Testicle has been bigger than one's Fist; and some of them I now keep by me in Spirits.

II. The *Signs*, by which a Sarcocoele may be distinguished from other Ruptures, are principally the Hardness of the Tumor, and its Seat being in the Testicle: whereas the true Herniæ are distinct from the Testicle, and softer to the Touch. If a Sarcocoele be not timely brought to Suppuration, it very easily degenerates into a Cancer, as we are assured by daily Experience, or at least becomes exceeding troublesome by its Bulk and Pain: and if both Testicles are affected, it frequently renders the Patient impotent. If the Tumor proceeds through the Inguen up to the Abdomen, even Castration will be useless, and Death the Consequence; because the Disorder is communicated from without internally: and therefore it will be more adviseable for the Surgeon to desist from the Operation.

III. A recent Sarcocoele may frequent be suppurated by digestive Medicines, as well internal as external. MATTHIOLUS, AQUAPENDENS, and SCULTETUS, tell us, *Rad. Ononidis* ʒ i. given to the Patient every Day in *Haust. vin. Absynthit.* is of great Efficacy: and externally the following Plaster is to be applied:

Cure by
Medicines.

℞ Gumm. Galban. Ammoniac. Bdll. aa ʒ ss. dissolut. in aceto adde Adip. anat. liq. & colat. ʒ i. ss. Cer. citrin. ʒ ii. Ol. Lilior. alb. Medull. crur. bov. aa ʒ x. M. F. Emplastrum.

This is to be spread on Linen, and renewed on the Part every third Day. DIONIS, treating of this Disorder in his Surgery, proposes a Mixture, *Ex Emplast. Diabotano, Divino, & Vigonis* aa; which he tells us he has sometimes applied with Success. Some prefer the *Emplast. Noriberg.* as a good Digestive in this Case, used either separately, or mixed with the preceding. Some recommend the *Emplast. de Cumin. vel e Baccis Lauri.* Others again extol the Vapour or Acid Fomentation, which we proposed in the Cure of a Scirrhus foregoing. For internal Medicines, the Decoction of the Woods, with Mercurials, have, in my own Experience, been found of the greatest Efficacy;

cacy; especially if the Patient takes a Sudorific every Morning, with a proper Regimen; and a mercurial Purge every third or fourth Day. It may be useful also to salivate; especially if it arise from a suppressed Gonorrhæa. See HOFFMAN; *Med. Consult.* P. III. p. 241.

Cure by
Castration.

IV. When other Medicines prove ineffectual, the Size and Pain of the Tumor increase, and it seems inclined towards a cancerous Disposition; if it has not yet reached the Ring of the abdominal Muscles, there is then but one Means left of relieving the Patient by a painful Operation, from an otherwise incurable and fatal Disorder. And that is a dextrous and timely Extirpation of the disordered Testicle, or both, if they are affected, by the Scalpel; which is termed Castration, and renders the Patient impotent, when he is this way deprived of both Testicles.

Method of
castrating.

V. The Operation for Castration is performed much in the same Manner as Celotomy, *Chap. CXIX. N° 6.* but it should be done with more Circumspection and Tendernefs. The spermatic Vessels should be first tied securely with a Ligature near the Inguen or Abdomen, and afterwards divided, to give the Patient less Pain: and the Wound may then be treated, as we have directed in the Cure of Ruptures. As a Division of the spermatic Vessels, which are so much enlarged, may be attended with a fatal Hæmorrhage, the most prudent Surgeons do for the greater Security pass a double Ligature round those Vessels, one below the other: or else they do not immediately extirpate the Testicle, as soon as it has been freed from the Scrotum, and its Vessels strictly tied; but they return it, and wait a few Days, till the Testicle begins to grow flaccid, and mortifies; which is a Sign the spermatic Vessels are well secured, and may be then divided without any Danger. But if that does not follow, the Ligature is not strict enough; and therefore another must be made much tighter. LE DRAN rightly advises a Needle and double Thread to be passed through the Spermatics, and so to tie them in two halves; as a more certain Method of preventing a future Hæmorrhage. AQUAPENDENS, SCULTETUS, and others, apply an actual Cautery to the divided spermatic Vessels: which severe Practice is, in my Opinion, deservedly rejected by the Moderns for the Ligature. Castration is therefore absolutely necessary for removing a cancerous Sarcocèle, which is otherwise incurable: nor is the Objection to it great, because one sound Testicle is sufficient for Procreation. I am not ignorant, that some advise a Separation of the Nerve from the spermatic Vessels, before the Ligature be made, to prevent Convulsions, as they say, from the Stricture on it. But that is both unnecessary and impracticable: unnecessary, because a Convulsion hardly ever follows the Stricture of the Ligature on so small a Nerve; and impracticable, because the Nerve is surprizingly ramified, and interwove with the spermatic Vessels, as we are assured by Anatomy, of which they must certainly be ignorant, who advise such a Practice. However, it may not be amiss to pass a Compress of Lint under the Ligature, about an Inch below which the Vessels should be divided.

* That the Disorder is frequently incurable by any Means, is confirmed, as well by the Observation of myself as others; and particularly WEPFER, *De Cicut. Aquat.* pag. 101. mentions a cancerous Sarcocèle, that weighed above two Pounds.

VI. If a Patient should be troubled with a fleshy Excrecence upon his Testicle, which is in other Respects sound, and finds no Relief from Medicines; the Testicle may be preserved, and the Patient freed from his Disorder by opening the Scrotum, and extirpating the offending Part only. But if it is rooted in the Testicle, or cannot be taken cleanly off; it will be necessary, either to remove the whole Testicle, or some Part of it^a. After which, so much of the Integuments of the Scrotum, as are superfluous, may be also extirpated with a Pair of Scissars; by which Means the Wound will heal with more Ease and Uniformity. With regard to the Dressing, that is to be made with scraped Lint and Compresses, secured by the Bandage *Spica Inguinalis*; and to abate the Inflammation, which sometimes arises, a discutient Cataplasim may be used, and the Wound afterwards treated with some digestive Ointment or vulnerary Balsam. Observations on Castration may be seen in TULPIUS, *Obs. Lib. IV. Cap. 32.* and SAVIARD, *Obs. Chir. 125.*

Method of treating an Excrecence of the Testicle.

C H A P. CXXII.

Of the HYDROCELE.

I. **W**E frequently meet with the Scrotum distended in some Subjects with a watery Humour, even sometimes to the Size of one's Head; without Pain indeed, but exceeding troublesome to the Patient. This kind of Disorder has been denominated, after the Greeks, an *Hydrocele*, or *Hernia Aquosa*. For the Generality, but one Side of the Scrotum, though sometimes both are distended with this Humour: to which all in general are liable, without excepting any Age or Sex. Even the Infant is sometimes born with this Tumor, or acquires it soon after Birth, as I have observed. But the Seat, or Part occupied by this Tumor, is not always the same: for it is sometimes included in the *Tunica Vaginalis*, or between the Testicle, and its including Membrane, in such a Manner, that the Testicle is thereby concealed from the Touch, and seems to swim in the Humour; which in that Case probably arises from a Rupture in some of the lymphatic Vessels of the Testicle. At other Times the Humour is lodged immediately beneath the Skin of the Scrotum, as CELSUS observes (*Lib. VII. Cap. 18.*) encompassing both the Testicles, particularly in new born Infants and hydropical Subjects. But when the Seat of this Disorder is in the cellular Membrane of the Scrotum, immediately under the Skin, it is distinguished from the *Hydrocele* by the Name of *Hydrops Scrotalis*; which we shall therefore consider by itself hereafter. Sometimes again, the Humour has been observed collected in the Processes of the *Peritonæum*^b above the Testicles: and I remember to have found a large Quantity

Hydrocele described.

^a DIONIS and others recommend the Application of Caustics to remove Excrecences of this Part, which may sometimes succeed tolerably well: but I am apt to think the Method by the Knife much more ready and safe.

^b This has been observed by WIDEMANNUS (*De Litho & Celotomia*, pag. 84.) BOERHAAVE (*Aphor. § 1227.*) GARENGEOT and LE DRAN (*II. Obs. 75.*) and I myself have also felt the Water in one of the Processes of the *Peritonæum* above the Testicle: which may sometimes happen after an En-

of an aqueous Liquor in a dilated Process of the *Peritonæum*, upon a dead Subject that had an *Enterocoele*. Sometimes the contained Liquor is of a sanguine Hue, or is mere Blood extravasated into the Scrotum, as I have seen by Accident. And this Species of the Disorder may be not improperly termed an *Hæmatocoele*, or *Hernia Sanguinolenta*, which was even not unknown to CÆLUS (Lib. VII. Cap. 19.) But more of this hereafter.

Diagnosis
and Prog-
nosis.

II. The Hydrocele shews itself by certain Signs, whereby it is not only discoverable itself, but also distinguishable from other Ruptures. It may be discerned (1) from the *Hydrops Scrotalis*, in that the last retains the Print of the Finger, the Skin appears pellucid and distended, and often the Penis itself is much swelled: whereas in the Hydrocele the Penis is rather drawn inward, and the Skin corrugated, and susceptible of no Impression from the Finger. In the Hydrocele the Tumor often returns, and disappears, and feels soft to the Touch, when the Humour is not too abundant; but the *Hydrops Scrotalis* is more fixed and resisting. The *Hydrocele* is also (2) distinguishable from the *Enterocoele* and *Epiplocœle*, in that the Testicle is frequently drowned or concealed in the Water of the first; but may be always felt on one Side of the Tumor, in the two last. But (3) the Difference betwixt the Hydrocele and Sarcocœle is not so obvious, but that it has deceived many expert Surgeons. The principal Criterion is the Difference in the Resistance to the Touch, the Sarcocœle being much harder than the other, and usually less in Size. I am sensible, it is a general Admonition, in distinguishing this Disorder, to hold a Candle on one Side of the Patient's Scrotum in the Dark; whereupon the Scrotum will appear in some Measure pellucid, like a Bladder full of Water. But as myself, with CÆLUS and ÆGINETA, have frequently observed the contained Humours very turbid, bloody, or dark coloured, like Coffee; every expert Surgeon must be satisfied, that this Method is very fallacious, or at least ought not to be over-much relied on. It is true, such an Appearance will confirm us, that the Tumor is an Hydrocele: but when it does not appear, we can hardly be certain it is no Hydrocele, without other Assurances, as the Humours may be bloody and opaque. The Tumor itself is generally more troublesome than dangerous; as it frequently obstructs the Patient's walking, and prevents him either from sitting or riding, when of any considerable Size. But if it continues a long Time together, there is Danger of the Testicle being corrupted or vitiated by the offending Humours, so as to give rise to a Sarcocœle, Scirrhus, or Cancer, of the Testicle. On the contrary, I have seen some Instances of the Disorder being sustained with no bad Consequences, and but little Incumbrance, during Life. But when the Penis is buried by a too great Distention of its Integuments, through a Redundancy of the Humours, it must at least greatly obstruct, if not totally prevent, a Procreation of the Species. Nor is the Disorder easily curable, either by Medicines or Instruments; but may be sooner effected in a young Patient, than one advanced in Years. Sometimes the *Hydrocele* and *Hydrops Scrotalis* are joined together in one Patient: and then the Cure of the first is impracticable before a Removal of the last:

terocœle, when the Intestine has penetrated into the *Tunica Vaginalis*, through the Septum, which divides the Testicle above from the Process of the *Peritonæum*. But this Case very seldom occurs; nor could I ever meet with the Parts in this State, among the many Subjects, which have been under my Care in both *Hydrocele* and *Enterocœle*.

To which we may add, that this Disorder is also sometimes complicated with a Sarcocelé or Enterocelé.

III. The Hydrocele is frequently curable by Medicines only, in young Patients: when a Course of Discutients and Corroborants are timely exhibited, and continued both externally and internally. The Application of Linen Compresses dipt in *Sp. Vin.* or *Aq. Hunger.* is found of great Service; as is also a Decoction of the warm and aromatic Herbs in Wine: To these may be added *Aq. Calcis* and *S. V.* at Discretion; which should be applied warm to the Part for several Days together. Nothing can be more efficacious for removing the Hydrocele in new-born Infants, when they are well in other Respects, than giving them a little grated or chewed Nutmeg every Morning fasting, breathing frequently upon the Part every Day at the same Time: which I should have hardly recommended, but that I am convinced of many Cures performed by it on Infants. *Sp. Vin.* held in the Mouth, and breathed upon the Part, is also serviceable: and Compresses expressed out of warm *Sp. Matricar.* and applied several Times in a Day with *Emp. de Cumino* are still more powerful. For internal Medicines, it may be proper to purge the Patient at Intervals, especially Infants, with *Rad. Rhabarb.* or something that will strengthen the Habit, as well as discharge the redundant Humours: and other corroborating and diuretic Medicines may be used between the Purges. The celebrated *Arcanum Duplicatum* of LUDOVICUS^a is said to be of surprizing Efficacy for the Hydrocele in Adults; insomuch that a few Doses of it continued, with external Resolvents, will totally dissipate the Disorder in a few Days. But I must confess, my Opinion is, it will be of more service in the *Hydrops Scrotalis* than in the true Hydrocele. If the Disorder is too obstinate to give way to these Means, as it usually is, when become inveterate in Adults, the last Remedy then left, is the Operation, which itself often fails of curing the Patient. When the Hydrocele is accompanied with an Inflammation, the Operation should then be deferred till that is abated.

Cure by Medicines.

IV. The chirurgical Treatment for curing the Hydrocele is of two Kinds. The one is a perfect or radical Cure; the other only imperfect or palliative. There is a two-fold Intention in curing this Disorder; viz. (1) of discharging the morbid Humours, and (2) of preventing their Return. To both which, the *Curatio perfecta* is equally accommodated: whereas the palliative Method regards only the Discharge of the retained Humours. But as the *Curatio perfecta* confines the Patient for several Weeks to his Bed, and is both painful, and in some Measure dangerous; it is not at all surprizing, that it should be so frequently rejected for the palliative Method, which may be more easily and expeditiously performed, with much less Pain and Danger. For which Reason we shall here first consider the *Curatio palliativa*.

Cure by Operations.

V. The Lancet was in use among the Ancients for discharging the contained Humours. But the Moderns justly prefer the *Trocar*, *Tab. XXIV. Fig. 1.* which is much more convenient for the same Purpose. The Method of performing the Operation is this: The Patient standing upright, or being seated on the Edge of a Chair, the contained Humours are then pressed downward, from the upper Part of the Scrotum, to distend the lower; which is thus

The palliative Method of Cure.

^a Vide *Miscell. Nat. Curios.* Dec. I. Ann. 9 and 10. Obs. 153. & *Opera ejusd.* Pag. 720.

kept distended, by passing a flat Ligature gently about its upper Part. Next the Trocar, of about a Finger's Breadth long, sufficient to pass through the Integuments, which are here thicker than usual, is to be cautiously inserted into the lower Part of the Scrotum, directing its Point outward, to avoid injuring the Testicle. The Scrotum thus perforated, after drawing out the Trocar, the Cannula is left behind, to discharge the contained Humours: which done, the Cannula is also extracted, which compleats the Operation. The Wound is so trifling, as to heal of itself, without any Plaster or other Medicine: and the Patient is then dismissed to walk about his Business. Yet it may not be amiss to follow the Practice of some, who apply thick Compresses to the Scrotum, moistened in *Aq. Calc. & S. V.* after the Operation. But if contained Humours are also lodged in the Process of the Peritonæum, above the Testicle, they are to be also discharged by another Paracentesis. And as the Scrotum will fill again within a few Months after the Operation, it will be necessary to repeat the Paracentesis when there is another Occasion; lest the stagnating Juices should contract an Acrimony, and affect the Testicles and internal Parts, so as to excite a worse Disorder. Thus the Operation may be repeated in Proportion to the Return of the Disorder, without much Trouble to the Patient, whom I have sometimes known survive to a great Age*. Even in robust and young Subjects a perfect Cure will be sometimes made by the first Extraction: but as those Instances occur but seldom, this Method of Cure has been justly termed palliative only. If the contained Humours should in process of Time become discoloured, foetid, acrimonious, or so thick, as not to pass through the Cannula, or if they resemble Blood, it will then be necessary to proceed to the *Curatio perfecta*. This GARENGEOT also advises, for the Removal of extravasated Blood from a Wound in some of the larger Vessels in the Scrotum, and in order to tie up the Vessels.

*Curatio
perfecta
described.*

VI. There are five Ways of operating for obtaining a perfect Cure of this Disorder; each of which we shall describe in order. The first is by laying the Patient on his Back on his Bed, or a Table, and securing him by Ligatures or the Hands of Assistants, as in the Operation for Celotomy. The upper Part of the Scrotum is then divided on one Side, where the Humour is lodged, by the Scalpel G or I (*Tab. I.*) till a sufficient Opening be made into the Cavity of the Scrotum, which may be safely divided down to the Bottom by the Incision Knife, and Director, or which is better, by the Forefinger of the left Hand, and a Pair of Probe Scissars. After discharging the Water, if the Testicle appears sound, the Cavity of the Scrotum is to be directly filled with scraped Lint, to be retained with proper Compresses, and the Bandage T. After removing this Lint, in the succeeding Dressings the whole Cavity of the Wound is to be treated with Digestives, that its callous Membrane or Lining may be cast off, and the small Vessels laid bare and healed, to prevent their future Discharge of a like Humour. But if the indurated Sacculus is of too hard a Consistence to be dissolved by simple digestive Ointment, it may be proper to scarify the Inside of the Scrotum, and mix a little *Merc. præcipit. rub.* with the Ointment; or it may be only sprinkled on the Surface

* *Vide SCULTETI Armament. Chirurg. Tab. XL. Fig. 2.*

of it when spread on the Lint. If that will not dissolve it, the Surgeon may remove as much of the toughest Part of it, as he well can, with the Scalpel or Scissars; and treat the rest with *Præcip. rub. cum alum. ust.* upon some digestive Ointment. When the Wound appears to be sufficiently cleansed, it may be healed up with some vulnerary Balsam. Sometimes an adipose Excrecence appears in the Cavity of the Scrotum, which should then be removed like the callous Lining. If the spermatic Vessels should appear tumified after opening the Scrotum, the Surgeon should not precipitately conclude, that the Testicle is therefore spoiled, and extirpate it, as useless, according to the Advice of some; when it is probable, those Vessels will return to their natural State again, without any farther Assistance. But when the spermatic Vessels appear indurated, as well as tumified, and give the Patient intolerable Pain; they may then be tied up, and the Testicle extirpated, as we directed in the Sarcocoele. It should be also observed, whether the enlarged Testicle contains any Lymph or Matter: and if it does, it should be rather opened and cleansed, than hastily and totally extirpated; because it frequently heals again, and performs its usual Office. But if it be found much indurated, or greatly corrupted, it is most adviseable to remove it, as before, to prevent it from degenerating into a Cancer for the future. And lastly, if the indurated Sacculus should be above the Testicle, from the Hydrocele being formed in the Process of the Peritonæum; great Care should be taken, in separating it by the Knife, not to injure the subjacent Testicle.

VII. As many, who are afflicted with this Disorder, will not submit to the Operation, for fear of the Knife, the Scrotum may be conveniently opened, and the included Humours discharged by a Caustic. In order to this, a large Piece of Plaster may be perforated in the Middle, and applied to the outside of the Scrotum: and the Caustic being laid on, the Perforation may be retained with a Linen Compress, another whole Plaster, and the Bandage T, as we before directed in the Chapter on the Application of Caustics. If the Caustic is not quite strong enough to penetrate through the Integuments of the Scrotum, the Eschar may be divided by a Probe Scalpel, or other Instrument, to discharge the Water: and after cleansing the Wound, and filling it with dry Lint, it may be treated as before, till the Patient is recovered. And by this Method I have perfectly cured several. GARENGEOT is greatly afraid of the Caustic mixing with the included Humours, and affecting the Testicle with malignant Symptoms: but his Fears are imaginary. For the Caustic no sooner makes its way through the Integuments of the Scrotum, but it is pressed out, and washed off by the discharging Water; and if any Part should enter the Scrotum, it will be so diluted with the Humours, as to prove inoffensive. Nor did I ever observe any ill Consequence attend this Practice, though I have so often made trial thereof by Experience. DOUGLAS, in this Case, prefers the Caustic to the Puncture, Incision and Seton. See *Syllab. Operat. Chirurg. in 4^o. p. 39.*

The second
Method.

VIII. The third Method of performing the *Curatio perfecta* in this Disorder, is by passing a Ligature in a large Needle (like what we advised for the Seton, *Tab. XVIII. Fig. 12.*) through the upper Part of the Scrotum, on one Side, so as to avoid the Testicle, and bring it out again through the Bottom^a. The

The third
Method of
operating.

^a Vide SCULTETI *Armament. Chirurg. Tab. LX. Fig. 1.* where this is shewn.

Ligature is then left in the Scrotum, as in a Seton, and drawn backward and forward once or twice every Day, after it has been rubbed with some digestive Ointment; by which means the Humours are not only discharged, but the indurated Sacculus and ruptured Veins are also digested off: after which, the Ligature may be extracted, and the Wound healed, as before. If the Suppuration does not succeed well enough from the digestive Ointment on the Ligature, a little *Merc. præcipit. rub.* may be added as before. But as the peccant Humours and indurated Sacculus cannot well be this way perfectly discharged, nor any Observation made, whether the Testicle is sound or vitiated; the Reader will not be surprized to hear, that the two preceding Methods (N^o 6. and 7.) are generally preferred and practised, as more safe and effectual than the present. For if any putrid Matter should remain behind, the Testicle prove scirrhus, &c. as in this Method it is very possible, the present Cure will be not only rendered precarious and uncertain, but the Patient probably subjected to a much worse Disorder for the future.

The Method of
MARINUS
and RUYSCH

IX. MARINUS^a, an *Italian* Surgeon, thinks the following Method much preferable to any other, as it is mostly used in that Country. The Patient being properly disposed, the *Scrotum* is then divided in its upper Part immediately under the *Inguen*, by an Incision large enough to admit one's Finger, and afterwards a Tent of Wax, about three Fingers breadth along, and the Thickness of one Finger, the Point of which is to be a little crooked. This Tent is to be dressed with *Ung. de Alb.* and inserted into the Cavity of the Scrotum, where it is to remain for the Space of twenty four Hours. This prevents the Water from returning; and therefore the Tent should be gradually diminished, as the Cavity is contracted, and the Tumor should be dressed with an emollient Plaster. When a good Suppuration ensues, the Tent is to be dressed with *Ung. digest. Galeni*; and *Ung. rosat.* is to be conveyed into the Cavity of the Scrotum. In about seven Days Time the Tent should be dressed with *Unguent. Hyperic. Comp.* the Sinus is to be cleansed, and the Wound incarnated and healed, keeping the Patient to a proper Regimen. Much the same Practice was also described before that Author by RUYSCH^b, who says, the Scrotum is to be opened in its upper Part on one Side, inserting an oblong Tent, dressed with *Ung. rosac. cum Merc. præcip. rub.* till a gentle Inflammation follows, attended with a mild Suppuration; whereby the Membranes, in which is the Seat of the Disorder, will be digested off, and should be extracted with a *Tenaculum*: by which Method I have known many obtain a perfect Cure. But it should be observed, that the Practice these Authors recommend, will succeed only when the Testicle is sound. For if we are assured, or may reasonably suppose it vitiated, it will be more adviseable to follow the first or second of the Methods here described, for performing the *Curatio perfecta*.

Another
Method.

X. There is still another Method practised by itinerant Medicafters; by which they make an Incision in the *Inguen*, and tearing the Scrotum off the Testicle, they extirpate it together with the Process of the Peritonæum, notwithstanding both of them are in a sound State: as they also do in the Enteroccele, which we before observed. But I think they ought to be severely repre-

^a *Prattica della principali operazioni, &c. P. 230.*
Adversar. Anatom. Dec. II. 22.

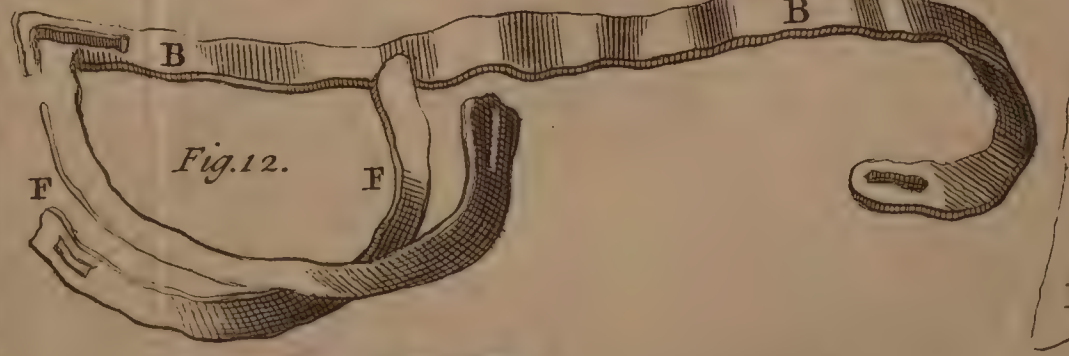
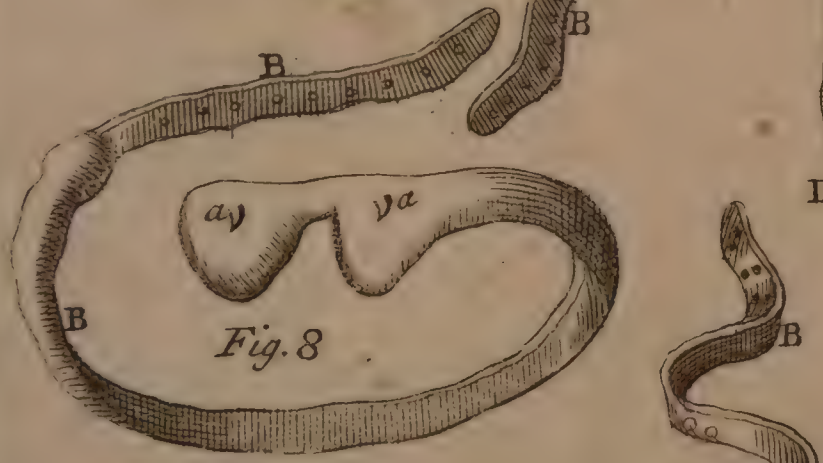
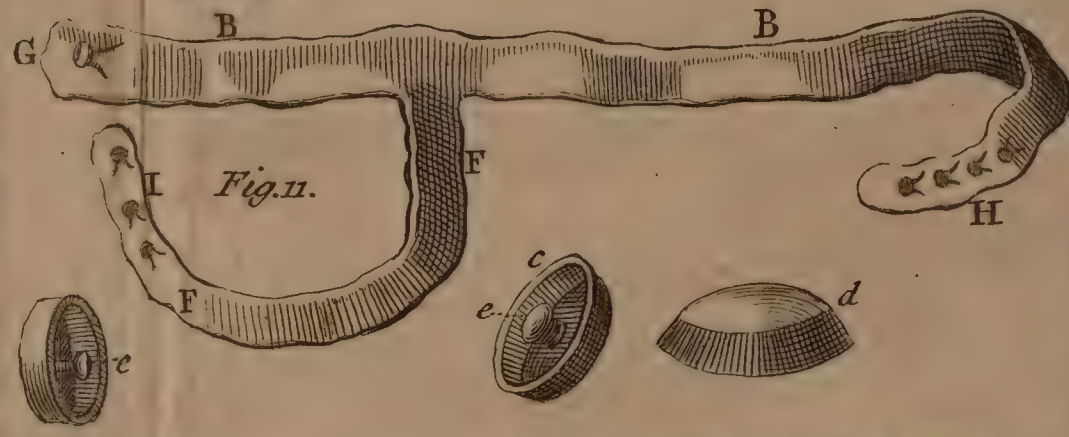
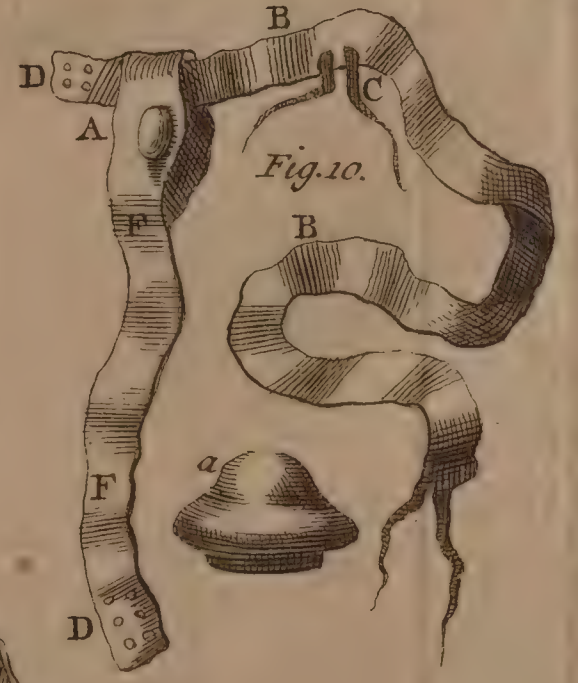
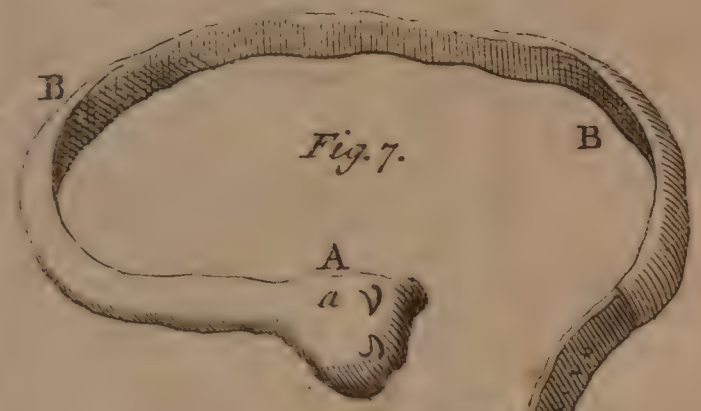
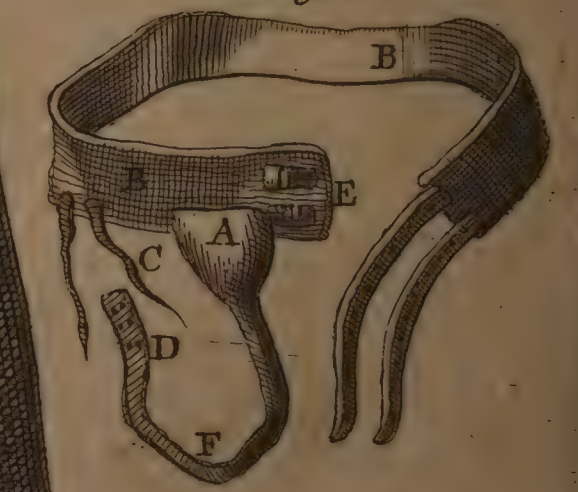
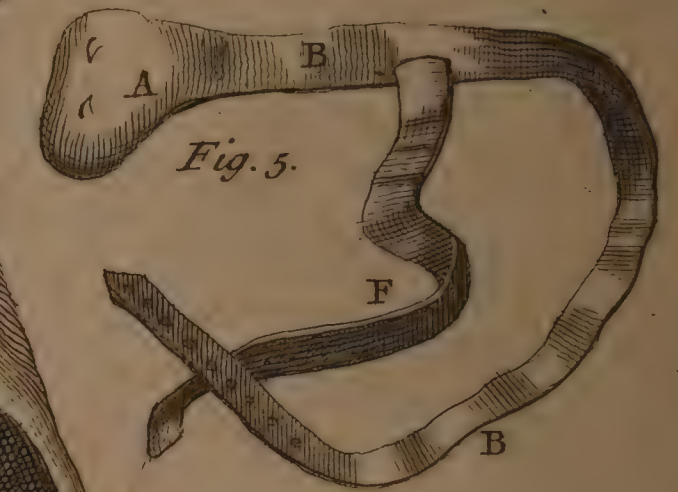
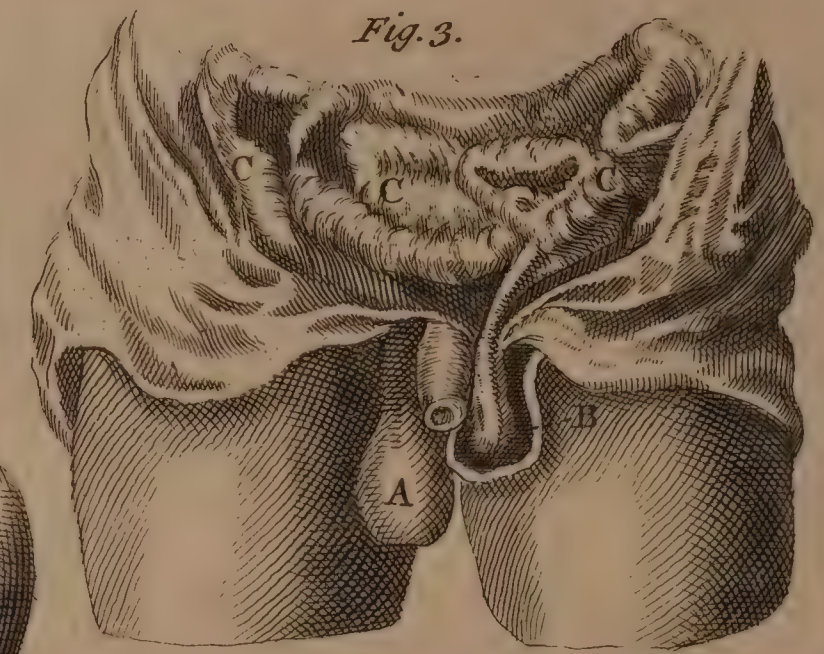
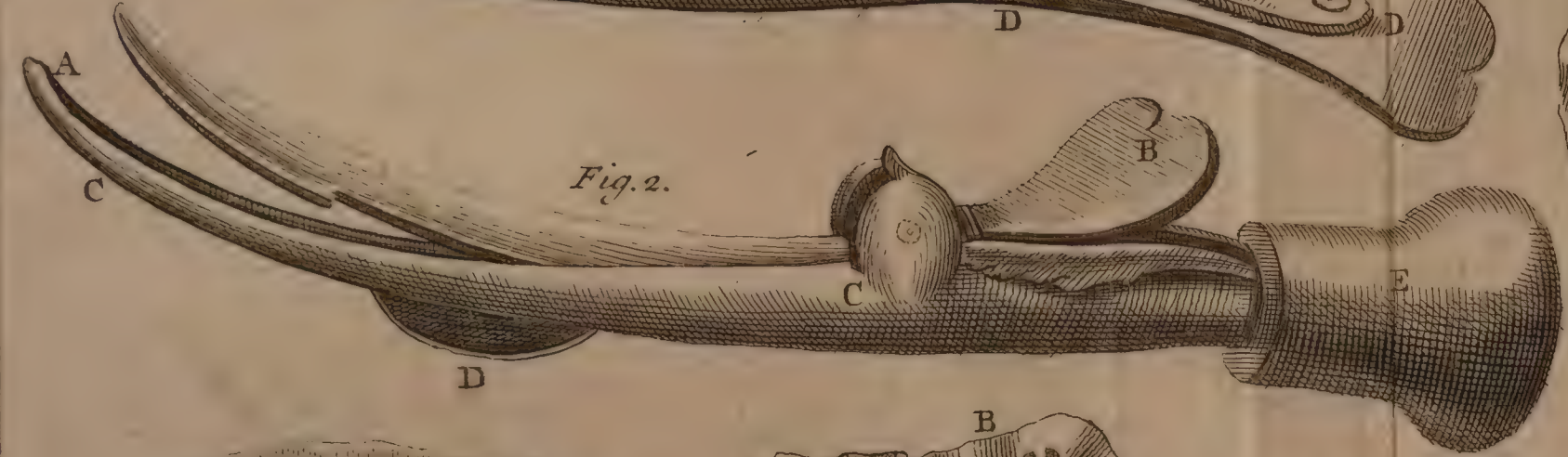
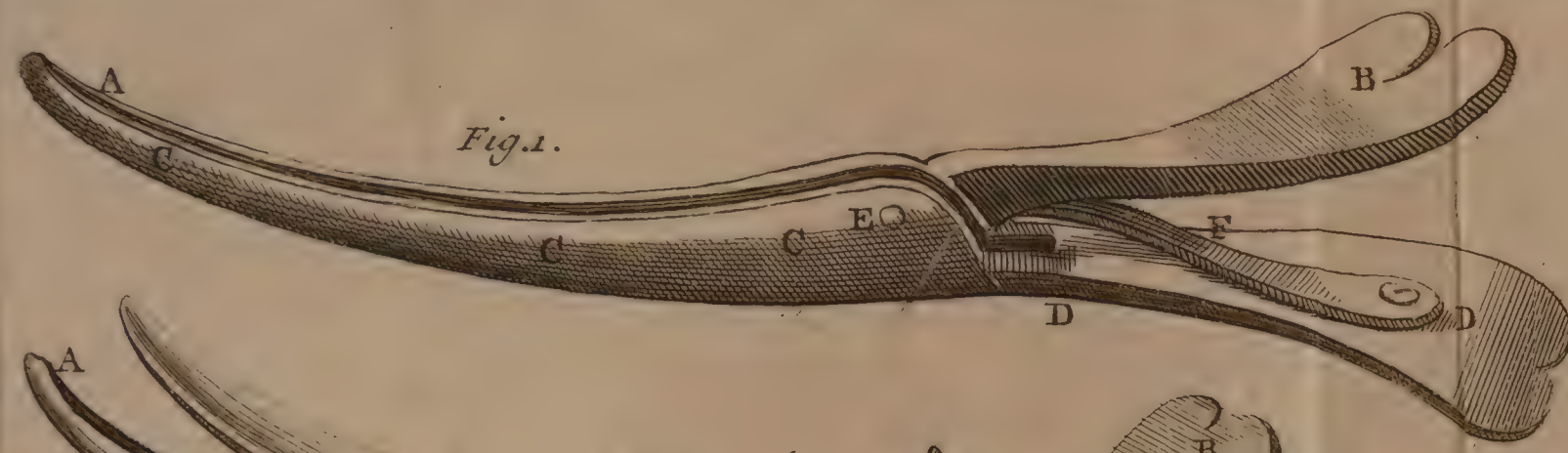
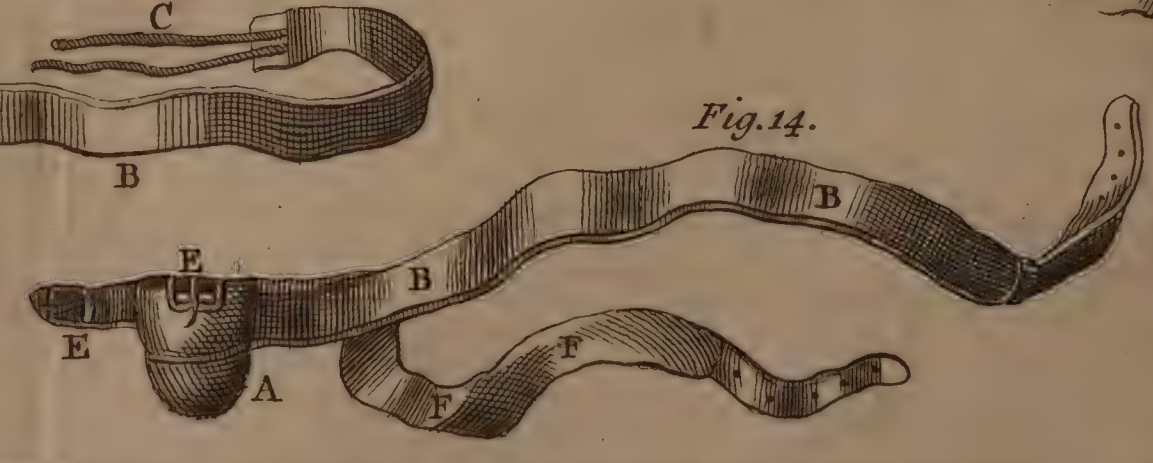
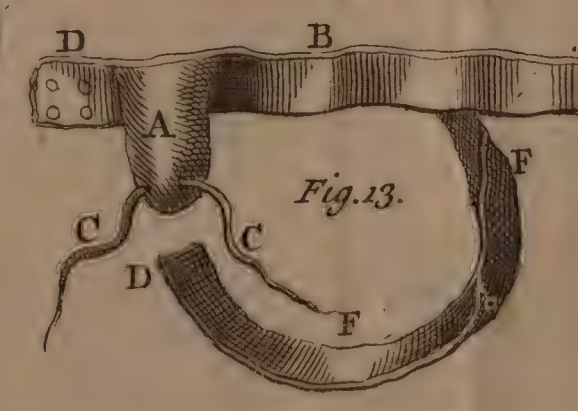
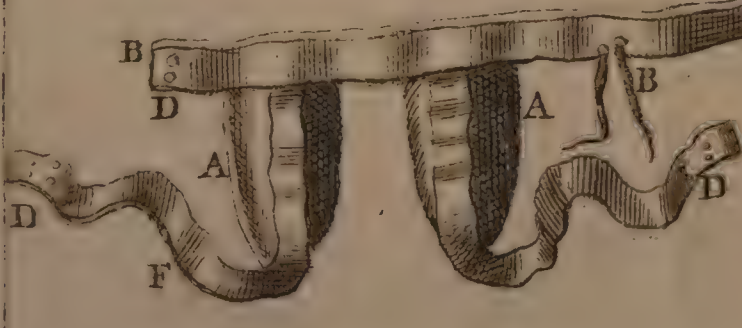


Fig. 9.



hended, and punished for their Barbarity and Male-practice. But if the Testicle is scirrhus, their Practice may be right: yet they ought to proceed in a more cautious and gentle Manner; as we advised *Chap. CXXI. Sect. IV.* To conclude, the *Curatio perfecta* will succeed best in young and robust Patients: but for those who are infirm, and advanced in Years, the *Curatio palliativa* may suffice: but in either Case, the Surgeon should be extremely careful not to mistake an Enterocoele for this Disorder; lest he should wound the Intestine, to the Destruction of the Patient.

An EXPLANATION of the TWENTY FIFTH PLATE.

Fig. 1. Represents a concealed Scalpel or Bistoury for dilating the Parts in Ruptures (in French *Bistouri herniaire cachée*) which is also recommended by some, as well for cutting *Fistulæ* of the Anus, as for incarcerated Ruptures. A, the Scalpel concealed in the Groove, CCC, till elevated to divide the Parts by depressing the Handle B. DD, the Handle of the whole Instrument; E, the Screw or Hinge, about which the Scalpel and Handle are moved. F, the Spring that returns the Scalpel again into its Groove, when the Handle B is not depressed.

Fig. 2. Is the preceding Instrument, or *Scalpellum Herniarium*, a little improved. AB, the Scalpel elevated out of its Groove CC; D, a flat Plate, in form of a Heart, to depress the Intestine, that it may not rise above the Scalpel, and be wounded. E, the Handle, somewhat different from the former, as is also the Hinge and Spring.

Fig. 3. A, represents the Scrotum, moderately distended on the right Side, by an Enterocoele. B, shews the Manner in which the Intestine CCC prolapses, and is reduplicated in the Scrotum, which is here divided. The Figure is taken from BERENGERE'S *French Treatise on Ruptures*.

Fig. 4. From the *Chirurgia* of PALFINUS. A, exhibits the upper Part of the Process of the Peritonæum; nor yet denudated in the *Inguen*, but laid bare by a Knife in its lower Parts BBBB. C, denotes the Testicle, and E, its spermatic Vessels; D, represents the Sacculus, being a Distention and Elongation of the interior Coat of the Peritonæum, formed by a Prolapsion of the Intestines, Omentum, or both, which are here extended almost down to the Testicle.

Fig. 5, 6, &c. to 15. Represent various Kinds of Trusses, to compress the Parts, and prevent a Relapse of the Intestine, when the Rupture has been reduced. Some of these (*Fig. 6, 12, and 13.*) are made of Callico, for Infants, or of Leather for Adults. Others (*Fig. 5, 7, 8, and 15.*) are made of Steel covered with Leather. Some are made of steel Plates joined by Hinges, so as to be flexible and more easy, as in *Fig. 15.* Some are designed for Ruptures on both Sides, as *Fig. 8, and 9.* Some are for Ruptures on the right Side, as *Fig. 6, and 7.* Others for the Left, as *Fig. 5, 10, 13, 14, and 15.* Some are fastened upon the Body by tagged Laces, as in *Fig. 9, 10, 13.* Others by Straps and Buckles, as *Fig. 6, 9, 13.* Others by Hooks and Eyes, or Hooks and Straps, as in *Fig. 5, 7, 8, 15.* And others again, by different Contrivances, as in *Fig. 11, 12.* A, denotes the Bolster or Compress in each Truss,

which is applied to the Ring of the abdominal Muscles, after the Rupture has been reduced. BB, the Girdle or Belt of the Truss, to be fastened round the Body, either with Strings CC, passed through the Holes DD, or by Straps and Buckles, as in *Fig. 6*, and *14*, EE; or with Hooks, as in *Fig. 5*, *7*, *8*, *15*, aa. In many of these Trusses there is a depending Girt, besides that which passes round the Body, which is to be passed between the Legs of Women, and fastened to the opposite Part of the Belt, as FF, in *Fig. 5*, *6*, *10*, *11*, *12*, *13*, and *14*. In *Fig. 10*. is shewn the Bolster a. In *Fig. 11*. may be seen a wooden Bolster cd; ee, the Button, by which it is fastened to the Truss; d, the convex Part, to be applied to the Rupture. There are many more Trusses of various Forms, contrived by such as make it their Business: but I have here only endeavoured to represent the best of them.

C H A P. CXXIII.

Of the HÆMATOCELE.

Hæmatocele described. I. **A**N *Hæmatocele*, or *Hernia Cruenta*, is when the Scrotum is distended with Blood (alone or mixed with Lymph) instead of Water. This Disorder has been observed, not only by myself and several other Moderns; but it has been also taken Notice of by the ancient CELSUS^a, among the *Latins*; and PAULUS^b, among the *Greeks*. Hæmatocele shews itself with the same Signs as the *Hernia Aquosa* preceding: but if the Scrotum be viewed against a Candle, it does not appear pellucid, like that, but dark and opaque, or blackish. A still surer Sign is, when in perforating the Scrotum by the Trocar or Knife, to discharge the Humours, Blood, or a bloody Lymph flows out instead of the Water.

Cause: II. The usual *Cause* of this Disorder is some external Violence, whereby the small Veins in the Scrotum are contused, lacerated, or burst, so as to extravasate their Blood into that Cavity. If it continues long in the Scrotum, it must necessarily putrify, and disorder the Testicle; from whence grievous Symptoms are to be feared.

Cure. III. The best Method of treating this Disorder for a Cure, is to open the whole disordered Side of the Scrotum by a longitudinal Incision, to discharge the bloody Humours. After the Wound has been well cleansed, if the Testicle appears sound, it may be immediately healed up again with some vulnerary Balsam. But as the spermatic Vessels are not corrupted so high as the Abdomen, a Ligature should then be made about those Vessels in the Inguen, and the morbid Testicle is to be extirpated as we have before directed.

C H A P. CXXIV.

Of the Hydrops Scrotalis and Pudendi.

THE *Pudenda* in both Sexes are often subject to dropical Swellings, from a Laxity of the Parts and Redundancy of Water in the Blood, which in-

^a Lib. VII. Cap. 19.^b Lib. VI. Cap. 62.

sinuating into the cellular Membrane next the Skin, makes it retain the Print of one's Finger, and sometimes almost buries the Penis. When the Scrotum is chiefly affected, the Water is lodged between its external Coats, and particularly in the cellular Membrane, which distinguishes the Disorder from an Hydrocele. Sometimes the *Pudenda* alone are inflated with an hydropical Tumor; but it more frequently accompanies an *Anasarca*, or dropsy of the whole Habit: in which Case a Cure can be hardly expected, until the general Disorder is first relieved. But when the Case is only partial, the discutient and corroborating Medicines, which we proposed in the Hydrocele, will be found of great Service; if used both externally and internally, and assisted with a proper Regimen. Great Benefit will arise to the Patient from a repeated Application of warm Compresses, dipt in *Aq. Calc. & S. V.* with the other Applications recommended in a spurious *Œdema*, Part I. Book I. Chap. XVIII. GARENGEOT thinks nothing better in this Case, than to scarify the Part, and apply *Emplast. Norimbergens.* full of small Perforations, to give a Passage to the Water: for which Purpose, *Emp. de Cumino, & diaphoretic. Mynsichti* may be also used. The Scarification may be repeated at Discretion, as the former grows dry. And if Scarification be not sufficient of itself to discharge the Water, a Kind of Seton may be made in the most depending Part of the Scrotum, according to the Direction of DEKKERUS, in *Exercitationibus Practic.* pag. 290. An Instance of the Scrotum being perforated with Success in this Disorder, may be also seen in SCULTETUS, *Obs.* 67.

C H A P. CXXV.

Of the HYDRO-SARCOCELE

AN Hydro-sarcocele may be discovered and distinguished from a simple Hydrocele, by perceiving a fluctuating Humour about the hard Body of the Testicle; or by finding the Testicle preternaturally enlarged and indurated, after the Water has been discharged. It is not easy to distinguish the Hydro-sarcocele from the simple Hydrocele, while the Scrotum is distended with Water: for, unless the Water be very small in Quantity, the Testicle cannot be felt by the Fingers. If the Patient is only willing to be freed from the superfluous Water, that may be easily done, as we have directed in the *Hydrocele simplex*. But when the Testicle is greatly tumified, indurated, and painful, it will be necessary to remove the Sarcocele, as well as the Hydrocele, in the same Operation. Therefore the Process of the Peritonæum should be first denudated by the Scalpel, and a Ligature made about the spermatic Vessels: and after freeing the *Tunica Vaginalis*, which is continuous with the Process of the Peritonæum, from the Scrotum, the diseased Testicle is to be extirpated, and the Wound treated as before.

C H A P. CXXVI.

Of the HYDRO-ENTEROCELE.

AN Hydro-enterocele is, when after the Intestine is returned into the Abdomen, there still remains a fluctuating and watery Humour on the same Side, near the Testicle. But when the Hydrocele is on one Side, and the Enterocoele on the other, they do not make one, but two distinct Diseases. In this Disorder, the Intestine is to be first returned into the Abdomen, and secured from a Relapse: and then the Hydrocele is to be treated either by the *Curatio perfecta* or *palliativa* preceding, according to the Patient's Inclination and Judgment of the Physician. There is another Method of Cure in this Disorder, which is performed as in the Enterocoele, *Chap. CXIX. Sect. XII.* But great Care should be taken, not to open the Scrotum before the Intestine is returned, and prevented from relapsing by the Hand of an Assistant; because, it would then be subject to be wounded, at the Hazard of the Patient's Life.

C H A P. CXXVII.

Of the PNEUMATOCELE, or HERNIA FLATULENTA.

Whether
such a Dis-
order is ever
observed.

I. WE are assured by several Authors, that the *Hernia Flatulenta*, or windy Rupture, does sometimes occur in Practice: but it is not, in my Opinion, rendered very probable, either from Reason or Observation. I am rather apt to think, they have been mistaken, for want of Judgment and sensible Demonstration; by which Means an Hydrocele or Enterocoele has imposed on them for a Pneumatocele. And I am the more confirmed in this Opinion, because the Symptoms and Cure of the Disorder, with which they acquaint us, agree exactly with those of the Hydrocele. For my own Part, I have been several Times concerned in Cases, where the Physicians and Surgeons have mistakenly supposed the Patient's Disorder a Pneumatocele; when in Effect it has proved to be one of the fore-mentioned. Thus MEEKREN, who was no unskilful Surgeon, intitles the *LI. Cap. in Obs. Chirurg. De Paracentesi Scroti in Hernia Flatulenta*: from whence the Reader might imagine, that there was in Reality such a Disorder. But if he goes through the Chapter, he will find, that Water, and not Wind, was discharged by the Operation.

Diagnosis
and Cure.

II. The Signs, by which those Authors tell us a Pneumatocele may be discovered, are (1) that upon handling the Scrotum, it feels like a Bladder distended with Wind; and that therefore (2) it seems to be much lighter, than if it contained any Humour; appearing also pellucid at the Approach of a Candle: and lastly (3) if it be struck by a Fillip of the Finger, it sounds like a Bladder, which is distended with Wind, and struck in the same Manner. But for myself, I could never observe any thing of this Disorder, though I have cured a great Number of all the other Kinds of Ruptures: which makes me suspect, at least, that the Case does not so often occur, as some would insinuate. But

whenever the Surgeon meets with it, he may proceed in the Cure, as follows. The Tumor may be treated externally, with the warm and discutient Medicines, which we advised in the Hydrocele; together with Fomentations and Plasters: and internally may be taken carminative and gentle Purges. But if these take no Effect, and the Tumor still increases, or continue the same, the Scrotum should then be perforated with the Trocar, and its Contents thereby discharged, which will demonstrate whether it was Wind or Water.

C H A P. CXXVIII.

Of the CIRSOCELE, or HERNIA VARICOSA.

I. **T**HE spermatic Veins are often preternaturally distended, or divaricated in the Process of the Peritonæum, immediately above the Testicle, and sometimes higher up in the Scrotum, or even in the Groin; inso-much that they resemble the Intestines of a Bird, and equal the Size of a Goose Quill, with *varicose Nodes*, or Inequalities, thicker in one Place than another: by which Means the Testicle appears much larger, and hangs down lower than it should do. And this is the Disorder, which has been usually denominated by Physicians and Surgeons, a *Cirsocele*, *Varicocele*, or *Hernia Varicosa*; though it might have been more properly termed *Varices* of the spermatic Vessels. Sometimes also the Veins of the Scrotum are thus disordered, as CELSUS observes: but such a Dilatation of those Vessels cannot be properly named a Hernia; but rather, with FABRIC. AB AQUAPENDENTE, Varices of the Veins. However, both Cases are frequently confounded, and improperly accounted one and the same Disease.

Varicocele described.

II. The Cause of either of those Disorders is usually thought to be in the Blood; being either too redundant in Quantity, or of a too thick and gluey Consistence: So that by stagnating in too great Quantities in those Veins, it occasions them to be thus preternaturally distended. Patients troubled with the Piles, and especially the external, are very subject to this Complaint, and their Urine is often bloody. Frequently, the Disorder also arises from some external Violence, whereby the Coats of those Vessels are contused, overstretched, and weakened, and the Blood by that Means impeded in its Course. I have sometimes also observed the Disorder in young Men, who are very salacious, and overstocked with Semen: in which Case, the Tumefaction has been most conspicuous, at some Distance from the Testicle, in the Scrotum. For a Quantity of Blood, much larger than usual, being then sent to the Testicle, by the Artery, the Capacity of the Vein must, in Consequence, be much enlarged or distended in Proportion. But whatever be the Cause of the Disease, it seldom gives the Patient much Trouble or Uneasiness. Nor is there any Necessity for the Use of Medicines, and much less any surgical Operation, except when it becomes intolerable to the Patient, by violent Pains, and other Uneasiness, which render it necessary to make Use of the subsequent Methods.

Causes;

Medicinal
Treatment.

III. If through Pain, or other Uneasiness, it becomes absolutely necessary to try some Means; as in healthy Constitutions, the Disorder may arise from a Redundancy of Semen in the spermatic Veins, the most ready and effectual Remedy will be Matrimony, which should be therefore advised to the Patient. But if the Case should happen to be in one already married, or that proceeds from some external Violence, there is but little room to expect a Cure from Medicines; as the lacerated or over distended Veins do but very seldom, by that Means, recover their former Elasticity and Vigour. However, such topical Remedies may be diligently applied, which are known to attenuate the Blood, and strengthen relaxed Parts: and for internal Medicines, it may be proper to call in the Advice of some skilful Physician. The Surgeon in particular should bleed the Patient, and try the Application of those aromatic and astringent Fomentations, which we directed in the Hydrocele, *Chap.* 122.

Treatment
by the
Knife.

IV. When other Means have proved ineffectual, and the Disorder still increases, or continues intolerable to the Patient, the Practice of the Ancients^a was then to pass a Ligature about the Vessels, or apply an actual Cautery. But as that Treatment appears too severe, when the Varices are in the Integuments of the Scrotum, I should rather approve of opening those, which are most distended, the whole length of the Tumor: and after letting them discharge a few Ounces of Blood, to make the Dressing with scraped Lint, a vulnerary Plaster, Compress, and proper Bandage; and to treat the Wound in the subsequent Dressings with some vulnerary Balsam. By which Method the inspissated Blood will be not only discharged, but the Vessels also rendered more firm and secure from future Distention, by the formed Cicatrix. But if the varicose Swellings are in the Veins within the Scrotum; the Integuments thereof, together with the Process of the Peritonæum, are to be first divided, to discover the Vessels, which are then to be treated as before.

V. In the mean Time, the Patient is to be recommended to drink plenty of thin Liquors, use frequent Exercise, with attenuating Medicines, and to bleed, at least, two or three Times in a Year. On the other Hand, he is to be forbid all gross and solid Food, with a sedentary Life, as greatly conducing to inspissate the Blood, and increase the Cause of the Disorder. The same Regimen should therefore be directed, as well to prevent the Disorder from growing worse, as for the Removal of it. The Practice of some, when the Tumor is very painful, is to make a Ligature about the spermatic Vessels and Process of the Peritonæum in the Groin, and then to extirpate the Testicle, together with the varicose Veins: But if the Vessels are indurated up to the Ring of the abdominal Muscles, the Operation should be omitted: for Death is the usual Consequence.

^a Vide FABRICIUS AB AQUAPENDENTE *Cap. de Hernia varicosa, in Operat. Chirurg.* and CELSUS, *Lib. VII. Cap. XXII.*

C H A P. CXXIX.

Of a Cancer and Sphacelus in the Testicle.

IF a Scirrhus of the Testicle should degenerate into a Cancer, or an Inflammation into a Sphacelus, or if the whole Body of the Testicle should be suppurated from any other Cause; there is then left but one, and a severe Remedy, to prevent the Disorder from spreading up to the Inguen, and into the Abdomen, so as to destroy the Patient. But if the Testicle be sphacelated only in Part, it must not be extirpated: in this Case the Abscess should be opened, cleansed and consolidated. And that is, to extirpate the Testicle, in the Manner we have explained, under Celotomy, in *Chap. CXIX.* and in *Chap. CXXI.* of the Sarcocoele. But the Admonition of GARENGEOT in every Castration is here very remarkable: *viz.* That an Incision should be made at the Ring of the abdominal Muscles; and, after separating the spermatic Vessels, a Ligature be made about them, at the Ring, or a little above it, before the Surgeon proceeds to meddle with the Testicle: which, he says, will facilitate the Cure, and give the Patient much less Pain. But for what other Reason he does not say. I should rather imagine that such an Incision would weaken the Part, and subject the Patient to a future Rupture, at least: to say nothing of the violent Pain, which the Patient must suffer from making the Incision and Ligature near the Ring; where, if a Ligature were to be made, there would be great Danger of Inflammation, and its Consequences internally. If such a Practice should be rendered necessary, from the Disorder in the spermatic Vessels having reached up to or beyond the Ring of the abdominal Muscles, I should even then think it most adviseable to desist from the Operation, as it never succeeds.

C H A P. CXXX.

*The Method of treating a Disorder of the PENIS.**Of a PHIMOSIS.*

I. *Phimosis*, so called from the *Greeks*, is, when the *Præputium*, or Fore-skin of the Penis, is by a violent Inflammation rendered so strict or tense, that it cannot be drawn back behind the *Glans*. This Symptom subjects the Patient to many bad Accidents, especially when it confines a virulent Matter between the *Præputium* and *Glans*. Which Matter being therefore incapable of a proper Discharge, as the Part cannot be cleansed, breeds *Chancres*: and in process of Time, as VERDUC observes, a Gangrene or Cancer, or at least a violent Inflammation of the *Glans* and *Præputium*, till at length the Penis is either consumed by those corroding Ulcers, or is obliged to be ampu-

*Phimosis
described.*

tated by the Scalpel. An *ardor urine*, or pain in making Water, is also a frequent Companion of this Disorder, from an Erosion of the *Glans* and *Urethra*.

II. The *Cause* of this Disorder is usually communicated by Commerce with unclean Women; whereby the virulent Matter lodged in the Sinus's of the *Vagina*, insinuates itself betwixt the *Glans* and *Præputium*, where remaining, it occasions an Inflammation, with the now mentioned Symptom, a *Phimosis*; and possibly some of its Consequences before enumerated. Though Instances are not wanting of a natural Stricture in the *Præputium* of this Part, in such a Manner, that the *Glans* cannot at all or very difficultly be denudated^a; but as the Disorder neither obstructs their making Water, nor the Procreation of Children, it does not require any Assistance from the Surgeon, unless an Inflammation or violent Pain, and Difficulty in the latter, should make an Incision necessary. But then they, who have their *Præputium* naturally very long, are more subject to this Disorder, and apt to retain the Infection than others, as we learn both by Reason and Experience.

Treatment
of the Phi-
mosis.

III. If the *Phimosis* does not proceed from any infectious Cause, it may be sufficient only to bathe the Parts a considerable Time in warm Water. But if it be a venereal or foul Case, proper internal Medicines are to be exhibited at the same Time, as well as the Pain, and other Symptoms mitigated by washing out the virulent Matter with warm Water, and an Injection frequently repeated, *ex decoct. bord. & mel. Rosar.* To disperse the Tumor externally, a discutient Fomentation or Cataplasm may be afterwards applied to the Penis; not forgetting to bleed the Patient, according to his Habit and the Urgency of the Inflammation. After these Means have been used some Time, the Surgeon should endeavour to draw back the *Præpuce*: which if he finds to be still impracticable, and the Disorder increasing, it will be necessary to perform the Operation, to avoid exposing the Patient to greater Injuries.

First Me-
thod.

IV. In this Case, there are two Methods of operating. The first is, by drawing the End of the *Præputium* forwards, while the *Glans* is held by an Assistant. The Surgeon pressing back the *Glans* in the extended *Præputium* with the Thumb of his left Hand, divides the extended Skin of the *Præpuce* by the Scalpel or Scissars before the End of his Thumb, much in the same Manner as the *Jews* circumcise their male Children. This done, the *Præpuce* may be turned back without much Difficulty; and the *Glans* being laid bare, may be cleansed, and healed of its Chancres.

A Second
Method.

V. Another Method is, to divide with a Pair of Probe Scissars so much of the *Præpuce*, as will suffice to denude the *Glans*, after it has been extended as before. GUILLEMEAU, PALEYN, and others, prefer a kind of Knife for this Operation, represented in *Tab. XXVI. Fig. 4.* But what should be the Reason of its particular Figure, and why a straight Scalpel might not answer the Intention as well, I must confess I am at present ignorant. The *Præpuce* being thus divided longitudinally, some Surgeons amputate with a Pair of Scissars so much of the Extremity of the *Præpuce* as they think superfluous. The Operation is usually attended with a pretty plentiful Hæmorrhage, which should not be stopped by Art, but permitted, according to the Patient's Strength, to abate the Inflammation. Then it is to be dressed with scraped

^a A Case of this Kind may be seen in *Hist. Acad. Reg. Scient. Ann. 1706. Pag. 31.*

Lint, and the Bandage proper for this Part. In the subsequent Dressings it may be treated like other Wounds; but should not be healed too hastily, nor closely, lest there should be Occasion to repeat the Operation. When the Præpuce has been thus divided, the Glans is sometimes drawn down by the Frænulum, so as to incurvate the Penis: in which Case, it may be proper to divide the Frænulum with a Pair of Scissars. If an incipient Mortification has seized upon the Glans, it will be necessary often to scarify the Parts affected, down to the sound Parts, and apply a Fomentation of *Ægyptiac. & Theriac. in S. V. Camphorat. solut.* which should be continued, till the Gangrene disappears. But if there should be any of those little obstinate Ulcers called Chancres, no good can be done without Mercurials internally given, and often so as to raise a slight Salivation; at least, the Patient cannot be safe under any other Method. I must not here forget to mention an Instrument, contrived by my intimate Acquaintance TREW, while I was at *Altorf*, for returning back the Præpuce, without Incision, in a Phimosis: see *Tab. XXV. Fig. 5.* Where the Plates AA being inserted under the Cutis, and being gradually let out by the Screw B, do, by their Elasticity, slowly dilate the Skin, till it may at last be turned back without Incision. But whether this Instrument will always answer the Expectation, I much doubt.

C H A P. CXXXI.

Of a PARAPHIMOSIS.

I. **W**E now proceed to a Disorder opposite to the former, which is from the *Greeks* called *Paraphimosis*: when the Præpuce, from its natural Shortness, or a morbid Stricture, cannot be drawn over the Glans, but remains contracted behind it. In this Case, it is usual for the Glans to be not only much tumified, inflamed, and painful, from the Stricture; but the free Circulation of its Blood being thereby obstructed, will shortly bring on a Mortification, which will make an Amputation of the Part absolutely necessary. Those are most subject to the Paraphimosis, who have naturally a short Præpuce, and are too intense in their Embraces with Women, who have very strait Passages, particularly Virgins. Therefore young Husbands, who have sometimes this Disorder, are greatly mistaken, when they think it arises from an Infection, contracted in deflouring their Wives: when in Reality it proceeds only from the natural Shortness of their Præpuce, and the Stricture of Virginity. Boys are also sometimes affected with this Disorder, when they lasciviously draw back their Præpuce, being extremely narrow, and afterwards causing an Erection, it cannot be returned over the distended Glans; from whence I have seen a suprizing Tumor of the Præpuce behind the Glans. But I would not have the Reader hence imagine, that the Paraphimosis does not oftner arise from unclean Embraces: for the Præpuce being inflamed and tumified by the infectious Matter imbibed by it, generally produces this Disorder, when it is also naturally short. The Paraphimosis is by the *Germans* called, from its external Appearance, a *Spanish Collar*.

Paraphimosis described.

Cure.

II. The Cure of a Paraphimosis consists chiefly in returning the contracted Præpuce over the naked Glans: which done, the Pain and other bad Symptoms quickly vanish. But as a violent Inflammation is usually the chief Cause of its being so difficult to return the Præpuce in the Paraphimosis, it may be first proper for the Surgeon to make Trial of discutient and emollient Fomentations, or Cataplasms, with *Sp. Vin. Camphorat.* before he endeavours to draw the Præpuce over the Glans: which being effected, all the other Symptoms vanish in Course. However, some Surgeons prefer the Use of cold Water to *Sp. Vini Campb.* or warm emollient Fomentations and Cataplasms; because the last often augment the Influx of Blood to the Parts, and so increase the Tumor. But when the Penis, Scrotum, and lower Part of the Abdomen, are immersed in cold Water, with plentiful bleeding, the Tumor generally subsides in a short Time. The Penis is then to be held betwixt the Surgeon's two foremost Fingers of each Hand; and the Glans, having been first lubricated with Oil, or Butter, is to be forcibly pressed back with his Thumbs, while the Præpuce is, at the same Time, drawn forwards under his Fingers, so as to cover the denudated Glans: in doing this, the Patient seldom fails to make heavy Complaints, of which the Surgeon should either be regardless, or else dispatch his Work the sooner, as CELSUS advises. When the Præpuce has been brought over the Glans, there remains but little else to be done in the Case. If the Inflammation be not very large, it may be often sufficient only to bathe the Parts in warm Water, when there is little or no Virulency; if the Patient be treated in other Respects, as we before directed.

Treatment
of a malignant
Paraphimosis.

III. But if the tumified Penis tends to mortify, through the Violence of the Inflammation, or long Continuance of the Disorder; it will be most adviseable to bleed the Patient first in the Arm, and then in the *Vena dorsalis Penis*: in which last, it should be continued till the Tumor subsides, and then the Præpuce may be drawn over the Glans, as before. PETIT's Method in the Paraphimosis, is to compress the Glans by a strict Bandage, passed one Part through the other, like the uniting Bandage: and when it is sufficiently contracted, he reduces the Præpuce over it, as before. Sometimes the Præpuce is so much distended with the serous Part of the Blood, that it appears like a Blister raised by Fire, or a Vesicatory, seeming very pellucid, and transparent to the Eye of the Spectator, and much obstructing the Reduction of it over the Glans. In that Case, it may be proper to make a few Punctures, with a Lancet or Scalpel, to discharge the distending Lymph; and after washing the Parts in warm Wine, the Præpuce is to be extended over the Glans as before. But to prevent the wounded Præpuce from growing to the Glans, as it otherwise may; the Surgeon should direct the Patient to frequently draw it backward and forward, and to wet his Glans over with his Urine, when he makes Water, which he should continue, till there is no farther Danger of their adhering together. The same Intention may be also answered, with equal Advantage, by frequently washing the Glans, and internal Surface of the Præpuce with warm Wine, or by interposing soft Lint. But if by Accident, or Neglect, there should be such a Cohesion of the Glans and Præpuce, it ought to be immediately separated by the Lancet, or a proper Scalpel; but with great Caution, for fear of wounding the Glans, which would induce a large Hæmorrhage. This Caution of keeping the Glans and Præpuce free from each other, while

they

they are so, is the more necessary, as it is with the greatest Difficulty, that they can be afterwards separated, when they are once firmly united. The Operation being finished, the Penis is to be bound up to the Abdomen; lest, if it should hang pendulous, the Inflammation and Tumor might return, at least in Part. I remember, more than once, to have seen the tumified Præpuce, behind the Glans, so much indurated, that the Hardness could never after be removed.

IV. When all the preceding Means prove ineffectual, M. PETIT's Method of proceeding is to incite the distended or contracted Præpuce, by inserting a small and crooked Scalpel, with the Edge outward, and the Back towards the Glans. And thus he divides the Præpuce by Incision, in three, four, or more Places, according as the Degree of Distention may make it necessary. And after washing the incised Parts in warm Wine, and reducing the Præpuce over the Glans, covered with a little soft Lint, the Penis is then bound up, and treated as before.

PETIT's
Method.

CHAP. CXXXII.

Of a CANCER and SPHACELUS in the PENIS.

IF a Gangrene, or incipient Mortification in the Penis, should succeed a Phimosis or Paraphimosis, it should be treated, as we have directed in Chap. CXXX. N^o. 3. But if a *Sphacelus*, or confirmed Mortification, or a *Cancer*, should infest the Penis, after a Scirrhusity of the Glans, the morbid Parts are, in that Case, to be immediately divided from the rest, to prevent the Disorder from spreading into the adjacent sound Parts, to the Destruction of the Patient. To perform this, the following is the most convenient Method. First, a small Cannula, or Tube of Silver, or Lead, a little longer than the Part affected, is to be introduced into the Urethra, so as to pass a little way beyond the unsound Part, which is to be divided. Then a strict Ligature is to be made with Thread or Silk in the Sound, immediately behind the diseased Part of the Penis, in the same Manner as in removing Tubercles and Wens, or fleshy Excrescences by Ligature. The inserted Tube, in the mean Time, is to be so firmly secured in the Urethra, that it may not fall out, or be displaced, but afford a free Passage to the Urine. The Ligature is to be thus left upon the Penis for several Days, until the Part diseased is thereby separated, and falls off: but if the Ligature should slacken in the mean Time, it may be made tighter every Day. I am not ignorant, that it is the Practice of some Surgeons to amputate the diseased Part, before there is a spontaneous Separation made by the Ligature, and then to stop the Hæmorrhage with an actual Cautey or astringent Medicines: by which Method some Patients have, indeed, been happily cured. But as such a Practice seldom succeeds well, being usually followed with malignant Symptoms, the Ligature, in my Opinion, seems to be much more preferable. It may be also observed here, that when a considerable Part of the Penis is left sound and entire, the Patient may be sometimes

^a Such is the Practice of SCULTETUS, *Obs*. 65.

capable of Procreation afterwards, more or less, in Proportion to the Length of the Part remaining. Those who are desirous of seeing some Instances of this Disorder, may read SCULTETUS, *Obs.* 60. and 65. HILDANUS, *Cent.* III. *Obs.* 88. and RUYSCH, *Obs.* 30: but particularly DOEBELLIUS, who has wrote expressly on the Disease, in a Treatise, published under the Title of *Relatio de Colea cancro infecto, sed per adhibitum ferrum feliciter curato. Lipsiæ, Anno 1698. 12°. cum figuris.*

C H A P. CXXXIII.

The Manner of dividing the Frænulum of the PENIS.

THIS Operation is necessary, when the Glans is drawn down in such a Manner by the Frænulum, that the Penis is thereby incurvated, so that it cannot be properly erected, and therefore renders the Patient incapable for Procreation^a. The Operation may be also equally necessary, when the Penis is after the same Manner incurvated in a Clap, Phimosis, or Paraphimosis, as we have before observed. In both Cases, the Frænulum of the Penis may be cautiously divided, either with the Scissars or Scalpel, almost in the same Manner, as we directed for dividing the Frænulum of the Tongue. After the Incision, the Wound may be dressed with scraped Lint, and the Penis bound in its natural Posture with Pasteboard or Splints. But sometimes the Penis is so incurvated, that it cannot properly be erected, notwithstanding the Frænulum is sufficiently loose. But that proceeds from a Mis-conformation of the internal Parts of the Penis; and is therefore very difficultly, if at all, curable. If such Men are desirous of entering into a State of Matrimony, and becoming Fathers of Children; and for that End require the Assistance of the Surgeon: he may try what can be done, by the Application of Emollients to the contracted Side of the Penis, and of Astringents to the other Side; assisting both with a proper Bandage, and sometimes by making small Incisions in the Integuments of the contracted Side.

C H A P. CXXXIV.

Of Warts, and other Excrescences of the PENIS.

THE several Tubercles and Excrescences, which infest the Penis, are almost constantly the Effect of some venereal Disease preceding. The Seat of them is various. Some arise in the Præpuce, others in the *Corona Glandis*, and others upon the Body of the Glans itself. The Generality of them resemble a fungous or spongy Flesh, and are very speedy in their Growth; being sometimes painful, and often not. The fittest Medicines for removing them are gentle Escharotics, as *pulv. Sabinae*, either alone, or mixed with *Alum. ust.* &

^a See HILDANUS, *Cent.* III. *Obs.* 54.

Merc. præcip. rub. with which it may be sufficient to sprinkle the Part a few Times: or it may be mixed with *Ung. Basilic.* or some other digestive Ointment, and then applied. If any of the Tubercles appear harder than ordinary, they may be gently touched every Day with *Lapis Infernalis*, till they are perfectly destroyed. If the Tubercle adheres by a slender Root, it may be conveniently taken off, either by the Scissars or Ligature, as we before advised, in removing other Warts and Tubercles. If the Excrescence has too broad a Basis to be conveniently removed by Ligature, with a hard and callous Apex; the Top of it only may be taken off with the Scissars; and after letting it bleed a while, and washing it with warm Wine, the Remainder may be taken down with *Lapis Infernalis*, as before. But the Method of destroying them by the actual Cautery, proposed and used by SCULTETUS (*Obs.* 65.) and FABRICIUS AB AQUAPENDENTE, is, in my Opinion, a Practice much too severe. To conclude; the Patient should, in the mean Time, be treated with proper internal Medicines, to carry off the contagious and virulent Matter of the venereal Disease: otherwise, notwithstanding their Removal, they will soon after break out upon the Patient again.

C H A P. CXXXV.

The Method of opening the imperforated GLANS or URETHRA.

I. **T**HERE are usually two Cases, in which, the Glans or Urethra being impervious, should be opened by the Hand of the Surgeon: *Viz.* (1) when the male Infant is thus born; and (2) in a Coalition of the Extremity of the Glans in Adults, when they discharge their Urine behind it. We may conclude, that the Urethra is impervious in Infants, if we find no Urine discharged for the Space of several whole Days after the Birth; the Infant, in the mean Time, being constantly uneasy, and crying. This, as soon as discovered, should be timely opened by Incision, to save the Life of the Infant, which would otherwise be certainly lost in a short Time. The Apertion is to be made differently, according to the particular Disposition of the Parts preternaturally joined. For sometimes the Præpuce is closed: at others, where it is open, there appears some Vestigia of the Urethra, and the Retention proceeds only from a thin Membrane. In the first Case, the Præpuce is to be treated after the Manner of the *Jews*: in the last, the Cure may be easily performed by a careful Division of the Membrane with a Lancet, or the Needle before described (*Tab.* XVII. *Fig.* 5. or 6.) for couching a Cataract. When the Urine has been thus discharged, a small Tent dipt in *Ol. Amigd. dulc.* and fastened to a Thread, may be inserted into the Parts divided, or a Bit of small Wax-candle may be introduced, and retained in the Urethra, to keep the Parts open. If the Membrane, which obstructs the Urethra, is of a more thick and fleshy Substance, the Perforation may be better made with the small triangular pointed Bodkin, or Trocar, like that represented in *Tab.* XXVI. *Fig.* 6. which may answer the Intention beyond either a Lancet or the Cataract Needle: and then the Parts are to be also kept open, as before. But if there are not the least Vestigia,

How to
perforate
the Glans
in Infants.

tigia, or Appearances of the Urethra, to be observed in the Glans of the Infant; it is a deplorable Case, which is commonly deserted by the Surgeon, as incapable of any Relief. But, in my Opinion, it is better to try a hazardous Operation in a difficult and dangerous Case, whereby there may be some Prospect of a Recovery, than wilfully to neglect the Patient, and leave him to certain Death. I must therefore commend the Practice of those, who in this Case also, perforate the Glans with one of the preceding Instruments; especially when the Urethra appears distended behind the Glans. And thus a new Passage can be made, and kept open with a Tent, or Wax-candle, as before. If the Operation does not succeed, so as to give the Urine vent this way, there is then no Means left: but either the Infant must be given over to Death, or the Bladder must be opened above the *Os Pubis*, or below in *Perinaeo*, as we shall presently describe in the Chapter on the Puncture of the *Perinaeum*. But whether this last Operation was ever performed for this Disorder in Infants, I am not certain.

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its,

II. There are also several Cases, in which the Assistance of the Surgeon may be necessary, to make a Passage through the impervious Glans of Adults. Sometimes the Urethra is indeed pervious; but in such a Manner, that the Urine does not pass at the End of the Glans, but rather in some Part of the Penis behind the same, at various Distances from the Glans, even sometimes discharging itself to the *Perinaeum*. Sometimes the Urine is discharged by two Apertures^a, one in the Glans, and another in some Part of the Urethra, behind the same; which is generally a native Disorder, from a Mis-conformation in the Womb, and grows up with the Patient from the Time of Birth. Though it must be owned, that it may sometimes arise from an Ulcer or Wound in the Penis, which penetrates into the Urethra, either by cutting out a Stone in that Canal, or to make way for the Urine, which is retained by a Calculus there: in which Case, a Passage is sometimes made naturally by an Ulceration from the Calculus, and Acrimony of the Urine. These preternatural Apertures in the Urethra are all of them very difficult to cure; the more so, as they are larger, and nearer the Bladder: and if the Opening be very large, there is no Possibility of healing it. Those who have their Penis perforated in this Manner, very near the Abdomen, are absolutely unfit for Matrimony, and incapable of propagating their Species: but those are not so, who have this Perforation about the Middle, or towards the Extremity of their Penis. These last may indeed celebrate the Rites of the Marriage-bed, in all Respects, so as the most subtle Parts of the *Semen* may have an Opportunity to pass into the *Uterus*^b. A Surgeon ought therefore to be very circumspect, in passing Judgment upon Cases of this kind, with Regard to Impotency and Divorce, before a Court of Judicature. If the Urine has a free Passage through some Part of the Glans, though it be not in its right Situation, there will be no Necessity for the Operation, which may be of dangerous Consequence to the Patient, by wounding the Glans: which, if it does not inflame, is always attended with a profuse Hæmorrhage. But if the *Urethra*

^a A Case of the *Meatus urinarius* opening betwixt the Back of the Glans and the Præpuce, may be seen described by RUYSCH, *Thesaur. Anat.* VIII. Pag. 21.

^b PAULUS (*Lib. VI. Cap. 54.*) advises to amputate the Glans in this Case.

has an Opening, either behind the *Glans* or the *Frenulum*, there are then two Things requisite to be performed by the Surgeon: (1) To make a decent Perforation through the Glans, as we before directed; and (2) to agglutinate and heal up the morbid Opening.

III. There are two principal Methods of perforating the Glans, which we shall here briefly describe; designedly omitting those, which are less commodious, and therefore not worth our Notice. The first way of operating is to divide the Urethra by a longitudinal Incision with the Scalpel, begun at the morbid Opening, and continued through the Glans, so as to lay the *Corpora Cavernosa* bare, without wounding them. The wounded Parts should be permitted to bleed plentifully, in proportion to the Patient's Strength and Constitution, in order to prevent a future Inflammation in them: after which, if the Hæmorrhage does not cease spontaneously, the Wound may be filled pretty tight with dry Lint, and the Dressing compleated with Plaster, Compress, and Bandage. In about four and twenty Hours Time after the Operation, the first Dressings may be removed, and a polished leaden Tube inserted, so as to pass through the Glans into the Urethra, beyond the morbid Opening; which is to be there continued till the Cure is compleated, for the Extramission of the Urine. The callous Lips of the morbid Opening are then to be gradually removed, by repeated Scarifications, or rather by amputating them with a Pair of thin Scissars: for the thinner the Blades of the Scissars are, the more easily do they divide the Parts, and dispose them to a more speedy Agglutination. The union of the wounded Parts may be also greatly promoted, by keeping them together with some Pieces of sticking Plaster. But the Body of the Penis should not be bound so strict, as to intercept the Blood's free Circulation, which would cause it to tumify; nor so slack, as to let the Lips of the Wound recede from each other. The Dressing is next to be compleated with Plaster, Compress, and Bandage; and the Cannula secured, that it may not be moved out of its Place: to prevent which, the Patient should be directed to be quiet in Bed, and advised to abstain from Drink for a few Days, lest by frequent making Water the Cure should be retarded, if not frustrated, and by the Urine insinuating through the Wound, at least give the Patient great Pain, and prevent the Plasters from sticking. Nor should the Dressings be taken off, without urgent Necessity, during the first three or four Days: and even then, they should be removed with great Tenderness and Circumspection, to avoid separating the Lips of the Wound, which are as yet but slightly closed. If the Wound be once perceived to unite, the same Plaster should still be continued on for a few Days longer: otherwise, a fresh one may be applied, and the Parts retained more closely together; compleating the Remainder of the Cure, as we have often directed before, in other Wounds.

First Method of operating.

IV. The other Method of perforating the Glans, is by directing the sharp triangular pointed Bodkin or Trocar (*Tab. XXIV. Fig. 2. or Tab. XXVI. Fig. 6.*) through the proper Part of the impervious Glans into the Urethra, and letting the Wound bleed as before. A long and slender Tent of scraped Lint is to be introduced, and the Part dressed up, to prevent farther Hæmorrhage: which being stopped, the Perforation may be kept open with a Piece of Wax-candle, as in the preceding Method. The next Day may be inserted a

Second Method.

fresh Tent, with some digestive Ointment, or Oil of sweet Almonds; but with this Caution, that it be not pressed beyond the old Orifice, so as to prevent the Urine from being thereby discharged, when there is Occasion, before the new Passage is cicatrized: for otherwise, by passing into the new Wound, it would give great Pain to the Patient, and much retard the Cure. The Urine should be therefore permitted to pass through the old Course, till the new one is cicatrized: to promote which, a Piece of Wax-candle is to be introduced, and dressed twice a Day with some desiccative Ointment. The new Passage through the Glans being thus cicatrized, the old one may have its callous Lips scarified, or amputated, and then strictly retained together, until they are united and healed upon the leaden Cannula, as before: after which, extracting the Cannula, the Cure is compleated. Sometimes the old preternatural Opening is so callous, and obstinate, as not to heal by any means. But even then, perforating the Glans, in this Manner, is not without its Advantages: for the Patient will be hereby rendered much more able to succeed in his conjugal Function; as a great Part, if not all the Semen, will be more perfectly directed into the Uterus. And thus some may be happily supplied with a desired Progeny, who have been many Years sterile, by this preternatural Defect. But there is one Observation very necessary, during the Cure of this Disorder; and that is, to bleed the Patient at Intervals after the Operation, especially when he is of a robust and full Habit: otherwise, the Patient is in Danger of having an Erection, which may lacerate the Lips of the Wound newly closed, and undo the whole Work.

Concerning
the Suture
and Caustics
in this Dis-
order.

V. I am not unacquainted, that some Surgeons prefer stitching together the Lips of the wounded preternatural Aperture; and that others are for removing the Callosity of them, rather by Caustics than by Incision. But neither of those Methods can well be approved of in a rational Practice. For the Stitches of the Suture breaking out, as they usually do, will rather enlarge the Wound than unite it: and the Use of Caustics here will be condemned by every body acquainted with their uncertain Operation, the Structure of the Part, and the great Pain or Inflammation they may this way bring upon the Patient.

C H A P. CXXXVI.

The Method of curing an Incontinency of URINE in Males.

Cause and
Treatment
of the Dis-
order.

I. **T**HE Neck of the Bladder is sometimes so much weakened in many of the male Sex, that they are thereby rendered incapable of retaining their Urine, often discharging it involuntarily, either sleeping or waking, attended with many other Inconveniencies. This Incontinency may proceed from two Causes, which are not unfrequent: *Viz.* (1) a Stone in the Bladder; or (2) a relaxation or paralytic Affection of the *Sphincter Vesicæ*. When the Disorder proceeds from a *Calculus*, there is no Remedy but Lithotomy, or an Extraction of the Stone. Nor is it often curable by Lithotomy, in as much as that Operation is frequently the Cause of the very Disorder itself. But when it arises from a Weakness of the Sphincter, the most likely Method of succeeding

ceeding in its Removal, will be by the Use of corroborating, and nervous Medicines.

II. But as the Disorder often receives no Relief from the best Endeavours of Physicians; Surgeons have therefore contrived various Instruments for retaining the Urine, that it might not be constantly dribbling, to the great Detriment of the Patient. Some are for advising the Patient to carry a Leather Bottle, or Bag, lined with Pitch, and of such a Figure, as to lie commodiously between the Thighs, being capacious enough to hold about half a Pint: others are for fastening a brass or steel Pot of the like Nature, to the Penis, represented in *Tab. XXVI. Fig. 7.* which are to be emptied when near full. But those Receptacles cannot be constantly retained upon the Part, taken off and on, and carried about by the Patient, without great Trouble and Inconveniencies. Some of our modern Surgeons have therefore invented more tight and easy Instruments, whereby the Penis and Urethra are gently compressed, so as to retain the Urine in the Bladder, and discharge it by Day or Night at Pleasure, with little more Trouble than in the ordinary Way, by opening and shutting the little, light, and easy Instrument, called a *Yoke*, exhibited in *Tab. XXVI. Fig. 8.* which is lined with Leather, and taken from NUCK. One of these Instruments, still more convenient, is represented by *Fig. 9.* which may be tightened and relaxed, according to the different Size of the Penis, having been frequently used with Success in many of these Cases, by my own Experience, and never before delineated by any Person that I know of.

III. A kind of Instrument was formerly published by NUCK, and not long after by WINSLOW, for this Disorder, being a Sort of steel Truss, to be applied almost in the same Manner as in Ruptures, which we have represented from NUCK, in *Tab. XXVI. Fig. 10.* It is to be fastened to the Body, so that the Bolster F may compress the *Urethra in Perinaeo*. Thus by turning the Screw D, the Urethra may be compressed or relaxed, and consequently the Urine discharged or retained at Pleasure. But though I am not for rejecting this Method altogether, I cannot but approve of the Yoke, as much more easy and commodious, of which I have often had Experience.

Contrivance
of NUCK
and WIN-
SLOW.

An EXPLANATION of the TWENTY SIXTH PLATE.

Fig. 1. Represents an *Enterocoele* on the right Side, as it appears before any Incision is made in the Integuments, out of MAUCHART's *Dissertat. de Hernia incarcerata Scroti*, from whence the two subsequent Figures are also taken.

AA, The Thighs drawn asunder, that the *Hernia* may be more distinctly viewed. B, the right *Inguen* distended by a Prolapsion of the Intestine. C, the sound *Inguen* on the left Side, more plain and depressed than the other. D, the Penis, drawn inward, as it usually appears in this Disorder. EE, one Side of the *Scrotum*, very much stretched or distended from the *Inguen* almost down to the Bottom.

FF, the Bottom of the *Scrotum*, neither tense nor distended, in which the Testicles may be felt separate, and not confused with the Intestine. GG, the other Side of the *Scrotum*, in its healthy Form and Appearance. HH, the *Raphe*, or Suture, that divides the *Scrotum* in its Middle.

Fig. 2. Represents the right Side of the Scrotum laid open by Incision. AA, the *Cutis* divided perpendicularly, and drawn to each Side, that the included Parts may come into view.

BB, the *Membrana Adiposa* divided, and drawn aside, in like Manner. CC, the Ring of the oblique external Muscle of the Abdomen; which being preternaturally dilated, admits the *Peritonæum*, or Sacculus, with its included Intestine, to fall through.

DD, the aponeurotic Tunic of the Testicle called *Dartos*, which invests the whole external Surface of the Sacculus, including the Testicle and Intestine, divided in the Middle, and separating the Sacculus, which adheres to it internally, and then drawn to each Side.

E, the cellular Membrane conspicuous betwixt the preceding and the internal *Lamina* of the *Peritonæum*.

F, the same cellular Membrane inflated by a Blow-pipe.

G, the internal Membrane of the Sacculus, formed by a Dilatation of the interior *Lamina* of the *Peritonæum*, immediately containing the Intestine, and divided in the Middle, so that the Intestine appears to Sight, marked HH.

Fig. 3. Represents the Situation of the Intestine, and other Parts in the *Scrotum*, in an *Enterocoele*, together with the internal *Sacculus Hernialis*.

A, tendinous Fibres from the *Aponeurosis* of the oblique external Muscles, marked DD, in the preceding Figure.

B, the external *Lamina* of the *Peritonæum*, turned a little outward, which being continued through the Ring of the Abdomen, or elongated over the spermatic Vessels, is termed the Process of the *Peritonæum*, or *Tunica Vaginalis* of the Testicle; but when preternaturally distended, it makes, in Conjunction with the aponeurotic Membrane (DD Fig. 2.) the external Part of the *Sacculus Hernialis*.

C, the interior *Lamina* of the *Peritonæum*, preternaturally distended, and protruded into the *Scrotum*, forming the internal Membrane of the *Sacculus Hernialis* immediately containing the Intestine.

DDD, the same internal *Lamina* continued to the *Septum*, formed of the *Tunica Vaginalis*, which parts the Testicle from it above.

EE, the Sides thereof drawn asunder, to shew the Course of the subjacent spermatic Vessels.

FF, the *Tunica Vaginalis*, loosely investing the Testicle, opened, so as to shew

G, the Body of the Testicle, now covered with only the *Tunica Albuginea*.

H, the *Epididimis* upon the Top of the Testicle.

II, the *Corpus Pampiniforme*, or Twinings of the spermatic Artery and Vein betwixt the external and internal *Lamina* of the *Peritonæum*, continued through the Ring of the abdominal Muscles.

L, the Canal, which conveys the Semen from the Testicle, called *Vas deferens*.

MM, Part of the *Intestinum Ileum* variously convoluted and included in the Sacculus of the *Peritonæum*, which is here removed.

Fig. 4. Is the Scalpel contrived by GUILLEMEAU, or at least delineated by him, for dividing the Præpuce in a *Phimosis*, in order to denudate the *Glaus Penis*. Another Scalpel of the same Form, but not so crooked at the Point, is

is represented by PALFYN, in his *Chirurgia*, pag. 176. where the Point is also armed with a little Ball of Wax.

Fig. 5. The Instrument contrived by Dr. TREW, for returning the contracted Præpuce in a *Phimosis*, without Incision: AA, are two elastic Plates, which are contracted or dilated by the Screw B.

Fig. 6. Is a small Trocar, or triangular pointed bodkin, for perforating the impervious Glans of the Penis; which may be used especially in Children, and new-born Infants.

Fig. 7. Represents the brass or steel Receptacle, recommended to be fastened betwixt the Thighs for receiving the Urine, in Cases of Incontinency. I should be large enough to hold about half a Pint. B, denotes the Mouth and Neck of the Vessel to receive the Penis, and which is to be fastened round the Body by the Ligatures cc.

Fig. 8. Denotes a steel Yoke, made of two Arms AA, covered with Leather, designed to restrain an involuntary Flux of the Urine, by compressing the Penis and Urethra. B, the Hinge, by which the two Arms AA are joined. C, a Turn-ketch to open and shut the Instrument at Pleasure. From NUCK's *Operat. Chirurg.*

Fig. 9. Is almost the same Instrument, a little improved, the Difference consisting chiefly in having a graduated Ketch c, whereby it may be contracted or enlarged at Pleasure, according to the Size of the Penis. The rest is explained by the Letters in the preceding Figure.

Fig. 10. Represents another Instrument for the Incontinency of Urine, taken from NUCK's *Operat. Chirurg.* *Fig. 11.* AA, the steel Girt or Belt to pass round the Body; B, the Buckle, by which the Leather Part c is fastened; D, the Screw, by which it presses against, and raises the Plate E, whose Bolster F, being defended with a Compress, is urged against the *Urethra in Perineo*.

C H A P. CXXXVII.

Of introducing the CATHETER^a into the Bladder, in order to search for the Stone, or discharge the Urine, when suppressed.

I. **T**HOUGH the passing of a Catheter into the Bladder may appear a slight and trivial Operation in the Eye of an inconsiderate Person; yet so arduous is sometimes the Task, either from an Inflammation in the Neck of the Bladder, or from certain Tubercles and Rugæ in the Urethra, or other Causes, that it even baffles the Skill of the most expert Surgeon, and is through various Impediments impracticable, even in the dextrous Hand, which is frequently versed in the Operation. There are usually two principal Causes, for which this Instrument is applied in both Sexes. The

Cases in which the Catheter is necessary to be used.

^a The Catheter (*καθετήρ* Galeno, Lib. V. *Meth. Med.* Cap. V. and ÆGINETA Lib. VI. Cap. LIX.) is described by the Ancients to be a long, hollow, and crooked Tube, used in Disorders of the Bladder. And this Name was retained by the Greeks. But CELSUS (Lib. VII. Cap. XXVI.) calls it *Fistula ænea*, from the Metal of which it was composed.

first is, to be satisfied with Regard to the Existence of a Stone in the Bladder, in as much as the other Symptoms of the Stone, such as Pain in the Bladder, Suppression of the Urine, a Strangury or *Ischuria*, &c. are often found to be fallacious, and not to be confided in: because the same Symptoms may arise from an Inflammation, Abscess, or Ulcer in the Bladder, from a Tumor or Excrecence in the Neck of the Bladder, &c. The second Case, in which the Use of the Catheter is necessary, is to discharge the Urine in an *Ischuria*; or when the Patient cannot make any Water at all, or but very little, and with Difficulty, from some Defect in the Bladder, so that the Urine is thereby retained, until the Bladder is extremely distended, with violent Pain, and other bad Symptoms^a. For if the Patient be not relieved in such a Case, by a timely Application of this Instrument, the Neglect will certainly be attended with an Inflammation, Mortification, or Rupture of the Bladder, or Death will be the End, in the Extremities of Pain, Anguish, and Convulsions. But it should be well observed, that the Catheter cannot be of Service in every Suppression of Urine. For when that Excrement is not conveyed into the Bladder, through some Fault in the Kidneys, or Ureters; the Introduction of this Instrument must be evidently to no Purpose. Such a Case may perhaps receive more Benefit from the Hand of a Physician than a Surgeon. Nor is the Catheter to be precipitately introduced in every Retention of that Urine, before other more gentle Means have been tried: as when the Bladder has been over distended, by retaining the Urine too long, through Bashfulness, from Cold, or any other Cause, in which the Patient feels a great Pain, and Tumor about the *Os Pubis*, the Tone and Contraction of the muscular Coat of that Recptacle being thus destroyed, and its Neck closed with a spasmodic Contraction. In these Cases, the Use of the Catheter should be postponed, until other more gentle Means have proved ineffectual: because the Instrument cannot be conveyed through the Curve Progress of the Urethra, without giving much Pain and Uneasiness to the Patient. In this Case, therefore, may be applied, especially in Children, *Ol. Scorpionum vel Cappar.* which is esteemed a Secret with FABRICIUS AB AQUA-PENDENTE. But I have always found the most Success from a Cataplasm *ex Cepis assatis* applied to the *Regio Pubis*. Sometimes a gentle Pressure of the Hand upon that Part will be sufficient to discharge the Urine, when it is retained from a Weakness or Relaxation of the Bladder. It may be also frequently discharged by Suction, with the Mouth, both in Infants and Adults. But when the Disorder arises from a violent Inflammation in the Neck of the Bladder, there is often but little Service to be expected from introducing the Catheter; as the Instrument must meet with a very difficult Passage from the Constriction of the inflamed Parts, causing great Pain, and perhaps a Laceration or Contusion of the tender Membranes and Vessels by its Resistance. Therefore if this Instrument be used in such a Case, the Surgeon will have

^a Thus HILDANUS takes Notice (*Cent. II. Obs. 65.*) of a Patient, from whose Bladder were discharged six medical Pounds of Urine. In another old Man the Bladder was distended almost up to the Navel, and the Abdomen so much enlarged thereby, that he resembled a gravid Woman. PANAROLUS (*Pentecost. I. Obs. 27.*) found near twenty Pounds of Urine in the Bladder of another Person, which was distended up to the Navel. Many more Instances may be seen in the Writers of Observations.

cause to fear a consequent Increase of the Inflammation, with Pain, Hæmorrhage, and possibly a Gangrene, Mortification, and Death. Whereas if the Patient is first bled, and the Inflammation abated by the Use of Glisters, emollient Cataplasms, &c. the Catheter may then be passed into the Bladder without much Difficulty. The Catheter may be therefore used (1) whenever the Urine cannot be discharged, from some Calculus obstructing the Sphincter, or Neck of the Bladder. (2) When the Bladder cannot discharge its Contents from some natural Weakness, as is frequent in old People, and in Women, from some Violence in their Labour, or intense Cold^a, when topical Remedies take no Effect. (3) When the Urine has been too long retained through Bashfulness, or any other Cause, whereby the muscular Coat of the Bladder is so much distended, as to lose its contractile Force, and become too weak to expel its Contents^b. Of which Case the celebrated Astronomer TYCHO BRAHE is said to have deceased^c. The Use of the Catheter is also not to be slighted (4) when the urinary Passages are obstructed by some thick Mucus, concremented Blood, Matter, or putrid Membranes, which may be lodged in the Bladder, after a Wound or Ulcer in the Kidneys, or may stagnate in the Neck of the Bladder after making bloody Urine. And lastly, it may be used (5) when the Urine is obstructed in its Course, by some Caruncle, Tubercle, Abscess, or Cicatrix in the Urethra, near the Neck of the Bladder, being harder and larger than ordinary, or from an Inflammation, Scirrhus, or Abscess in the Prostate, or a Tumor thereof, from any other Cause, so as to obstruct the Urine. However, as the Catheter can never be introduced without giving a good deal of Pain and Uneasiness to the Patient, that ought always to be deferred, till more gentle Means have been found ineffectual.

II. But the Catheter may be introduced with much more Ease in Women than in Men; as the Urethra in the first is much shorter, wider, and in a straighter Course. Though even in Women, the Instrument cannot be easily passed, by one that is not previously acquainted with the anatomical Structure and Situation of the Parts, particularly of the *Os externum Urethrae*, with regard to the rest. For there are many small *Fovæ*, *Lacunæ*, or Sinus's, at the Entrance of the *Vagina*, which may deceive the Surgeon. For the more ready finding the Orifice of the Urethra, the Surgeon is to observe, that it lies within the external *Labia*, in the upper Part of the Entrance of the *Vagina*, about a Finger's Breadth below the *Clitoris*, as represented in *Tab. XXIX. Fig. 2. D*, where it will appear, upon diligent Inspection, like a small and hollow Cicatrix. To pass the Catheter into the Bladder, the Woman should be first laid in a supine Posture upon a Bed or Table, and after separating the Thighs and external *Labia* from each other, which should be held apart by the Hands of the Surgeon, or rather an Assistant, one of the silver Catheters^d represented

Method of
introducing
the Catheter in Women.

^a As is observed by AMATUS LUSITANUS, *Cent. IV. Curat. 10.* FORESTUS, *Lib. XXV. Obs. 18.* and PECHLINUS, *Lib. I. Obs. 10.*

^b Examples may be seen in AMB. PAREY, *Book XVI. Chap. 48.* FORESTUS, *Lib. XVI. Obs. 25.* and *Lib. XXXV. Obs. 3.*

^c By HILDANUS, *Lib. de Lithotom. Cap. III.* and more at large by GASSENDUS, in *Vita ejus*, *Lib. V. p. 178.*

^d The Catheter was formerly made of Brass or Copper, but the Moderns make it of Silver well polished, as the *Arabians* did. V. ALBUCASIS, *Lib. Cap. 58.*

in *Tab. XXVII. Fig. 1. and 2. or XXXII. Fig. 7.* is to be slowly and carefully passed through the *Meatus urinarius* into the Bladder. The Size of the Catheter may be about the Thickness of a small Goose Quill, and its end should be first dipt in Oil^a. The Instrument being rightly passed, the Wire marked A, is then to be drawn out of the Tube, and the Urine by that Means discharged through the Apertures B, supposing the Instrument to be used for discharging the Contents of the Bladder. But if the Catheter is passed into the Bladder to search for the Stone, it is to be gently turned about, from one Side to the other, in all Directions, attending diligently to observe if any Sound is emitted, by striking the Catheter against the Calculus. If so, there is Reason enough to believe the Existence of a Stone in the Bladder: but if only a Resistance be felt without any Sound, it may possibly be a Scirrhus or other Tumor. With Regard to the Catheter itself, such are most approved of for Women, as are straight, or but very little inflected, as that in *Tab. XXVII. Fig. 1.* but I do not think that very material, since those, which are much longer, and more inflected, may be used almost with equal Advantage. I mean such as are intended for Men, *Tab. XXVII. Fig. 2, 3, 4, 5, and 7.* When the Urine has been thus discharged, the Cure is often compleated, but not always. For when there is expected a speedy Return of the Complaint, the Catheter is to be left in the Urethra, or else introduced again, till the Bladder has recovered its proper Tone or Strength to discharge its own Contents of itself. It is therefore most adviseable to pass the Catheter without any delay, when there is a Suppression of Urine in Women, who have a difficult Labour; lest their Delivery should be so slow and tedious, as to distend and weaken the Coats, till they become paralytic, or the Nerves relaxed, so as to render the Disorder ever afterwards incurable.

Method of
passing the
Catheter
in Men.

III. To pass the Catheter in the Bladder of a Male, is a Task much more difficult, than to pass it in a Female Subject: because in the first the Urethra is so long, narrow, and variously inflected, that it may well puzzle a Surgeon, who is unacquainted with the anatomical Structure of the Parts (represented in *Tab. XXIX. Fig. 1. ABCD*) and the proper Artifices which are used by other Surgeons in the Operation; having also never before made trial upon dead Subjects. Though this Operation is much better shewn by Example, than described by Words, we shall for the Sake of Beginners endeavour to explain it in the best Manner we are able. In the first Place, it will be necessary for the Surgeon to have a Set of Catheters of various Sizes, to suit different Patients; four at least (tho' CELSUS (*Lib. VII. Cap. 26.*) thinks three of a moderate Size will be sufficient) of different Lengths, Diameters, and Curvatures, as in *Tab. XXVII. Fig. 2, 3, 4, 5.* *Fig. 2.* is for a Lad of about six Years old. *Fig. 3.* for one of twelve Years. *Fig. 4.* for a young Man of about sixteen. And *Fig. 5.* for those who are more adult. The longest should be, according to CELSUS, fifteen Fingers breadth, and the shortest nine Fingers breadth long, which may be a very sufficient Proportion for the Undertaking, the intermediate ones being in Proportion. Some approve of their being very small, or

^a When I have been at a Loss for such an Instrument in the Country, I have often used a small Goose Quill in its Stead, for discharging the Urine.

slender, thinking that thereby they have a more easy Passage into the Bladder. In this they are much mistaken: because the most slender ones are apt rather to catch and stick in the *Rugæ* and Inequalities of the *Urethra*, which often appear very considerable in old Men, so that the whole Operation may be thereby frustrated. This is confirmed with two Examples by HILDANUS^a, in which neither himself nor the Lithotomist could pass a very slender Catheter into the Bladder: but upon introducing a larger, about the Size of a Goose Quill, they found a ready Admittance. The same is also confirmed by Dr. RAW, and by my own Experience. Those are the best Catheters, which are made of polished Silver, having their Curvatures in a certain Proportion, being charged with a silver Wire AAA, to prevent them from bending in the Operation.

IV. To perform the Operation, the Male Patient is to be laid on his Back upon a Bed or Table. Then the Surgeon standing on the right Side, takes hold of the Penis with his left Hand, and elevates it; while with his right Hand he takes a Catheter fizable to the Patient, by the Handle C, and dipping the End of it in Oil, proceeds to apply it with the convex Part towards the Abdomen, as in *Tab. XXIX. Fig. 3.* gently thrusting it forward, till he has reached the Bottom of the *Os Pubis*. That done, he then gradually turns the Catheter by its Handle from the left Hand towards the Abdomen with a certain Dexterity^b, so that the concave Part of the Catheter is now towards the Abdomen, as in *Fig. 4.* Then the End of the Catheter B, is gently pressed downward under the *Os Pubis*, and then upward into the Bladder; and by drawing out the Wire the Urine enters by the Apertures BB, and flows out through the Tube. In this Manner the Catheter may be also introduced, when the Patient is standing, or sits inclined in a Chair. The Catheter may also be easily passed into the Bladder, if the Patient be laid on a Bed, and the Surgeon standing on his left Side, elevates the Penis, and a little inclines it towards the Navel; and then applies the Catheter with its concave Part towards the Abdomen, protruding it into the Urethra down to the *Os Pubis*, and so thrusting it under the Symphysis of those Bones without the artificial Turn, moving the Catheter in the Urethra, somewhat in a circular Position. This is a method much easier to be practised with Success by those, who are not versed in the Operation, than the preceding.

Method of
Operation in
Male Pa-
tients.

Another
Method.

V. But in either of these Methods the Surgeon should proceed with Prudence and Gentleness; lest by too great Violence he should lacerate the Urethra, and thereby excite violent Pains, profuse Hæmorrhage, dangerous Inflammation, and perhaps Death itself: for I have known all these ill Consequences brought on by an unskilful Treatment in this Case. Sometimes the Patient is perfectly freed from his Complaint by the first Discharge of the Urine by the Catheter: at other times it will be necessary to repeat the Operation at certain Intervals, when the Urine cannot be voided by the Patient without. For the Cause of the Retention in the Urine is not always to be removed by the Catheter: only the most grievous Symptoms, which it occa-

Cautions to
be observed.

^a Cent. II. Obs. 65. Cent. IV. Obs. 65.

^b The French call it *le tour de Maître*, or the masterly Turn; because it is not easily performed by those who are not expert in it.

sions, are hereby relieved, for the present; such as violent Inflammation and Distension of the Bladder, Caruncles, Tumor of the Prostate, &c. Thus the End of the Catheter often cannot pass into the Bladder, from an Inflammation in its Neck: but after abating the Inflammation by bleeding, and proper Medicines, the Catheter may then be passed into the Bladder, which it could not before. If the Urine does not discharge itself by the Catheter, as soon as introduced, which sometimes happens; in that Case, it should be assisted by gently compressing the Abdomen with the Hands, by rubbing it, or by Suction, by either of which Assistancess the Urine will often follow. If in passing the Catheter, the End of it should meet with some Obstruction from the natural Caruncle of the prostatic Gland, which is termed by Anatomists *Caput Gallinaginis*; the Catheter should not then be forcibly thrust forward, so as to injure any of the Parts: but it should rather be drawn a little back, and then gently protruded again, by which Means it will often pass over the Obstacle, and enter the Bladder. If a Caruncle from a Venereal Cause should obstruct the Passage of the Catheter in the Urethra, that indeed may be forcibly broke through by the End of the Catheter.

Method of
searching
for the
Stone.

VI. If the Catheter be passed into the Bladder to search for the Stone, (for which Purpose SHARPE recommends a steel Catheter) the End of it should then be carefully directed to all Parts, as we before observed; and if, at the same Time that the Instrument meets with a considerable Resistance, you observe a Noise, from the meeting of the two Bodies, there is no room to doubt of the Existence of a Stone in the Bladder. But if that Sign cannot be found by the Surgeon, he may therefore reasonably conclude, that there is no Stone, or at least much doubt of its Existence in the Bladder. If a hard and sonorous Body should have been once touched by the Catheter, after long searching, and the same cannot be easily met with again, it is a Sign, that the Stone is either very small, or lies concealed in some small Cavity or Cell of the Bladder, as may be observed in *Tab. XXIX. Fig. 1. and 2.* And, in this Case, it is better to search with the Finger through the Passage of the Anus: by which Method you will be more certain of the Existence of the Stone, and also of the Size and Figure of it, than you can be by the Catheter. But, if the Catheter immediately and constantly strikes against a hard and sonorous Body, it is a Sign the Calculus is very large. If the Catheter slides easily over the Surface of the Calculus from one Side to the other, it is a Sign of a smooth Stone. But if the Patient has sometimes bloody Urine, and the Catheter moves over the Stone with a considerable Resistance, it denotes the Calculus to have a rough or uneven Surface, or, as CELSUS (*Lib. VIII. Cap. 26. N^o. 2*) terms it, *Superficies spinosa*. And lastly, if the hard Body is not easily moved by the Catheter, and affords a clear or brisk Sound, it is reasonable to suppose the Calculus to be of the larger and more compact Kind. Whereas, if it appears to have no great Weight by the Catheter, and yields a dead or flat Sound, the Patient's Urine being also fabulous, it is then probable, as CELSUS observes, that the Calculus is of a more soft and loose Texture. Which Observations are both confirmed by Experience, and the Authority of the celebrated Lithotomist of *Leyden*, JAC. DENYS, in his *Obs. Chirurg. de Calculo*.

VII. But

VII. But to prevent a Renewal of the excruciating Pain to the Patient, and Trouble to the Surgeon, from repeating the Operation of passing the Catheter, when the Retention of Urine will follow again in a short Time, either from a Contraction of the Neck of the Bladder, or from successive Obstructions with a Calculus, &c. in that Case, our modern Surgeons have provided a Kind of flexible Catheter, made of flatted silver Wire, convoluted in a particular Manner, as in *Tab. XXVII. Fig. 6.* to give a continual Passage to the Urine. This Instrument may be left in the Parts for many Days together, without incurring any Damage to the Patient, if it be properly secured or fastened, until there is no longer any Necessity for its residing there. But as the flexible Catheter is usually much more difficult to pass into the Bladder than the other; it will be generally necessary for the Surgeon to pass a common or rigid Catheter through the Urethra first, and let it reside there some Time, in order to open and dilate the Passage, through which the flexible Catheter is afterwards to enter into the Bladder. This should be done immediately after the Extraction of the other Catheter, to prevent the Parts from collapsing again. HELMONT^a rejects Catheters made of Silver or Copper, as too stubborn for the tender Parts they are to enter; and therefore devises another, to be made of Leather, sewed together in the same Form: for which Invention he much applauds himself, as he thinks little or no Pain will attend the Use of this last, from its Softness. But this, in my Opinion, seems to demonstrate how little that famous Gentleman was conversant in chirurgical Operations: for the very Advantage, which he proposes, viz. the Softness of the Instrument, renders it useless in the Hand of a Surgeon, as it will not thereby be able to make its Way into the Bladder. FABRICIUS AB AQUAPENDENTE also informs us, that he had used a flexible Catheter, which he had made him of Horn: and others have been made of other Substances. But those made of Silver are at present in universal Use and Esteem with the most expert Surgeons, as they have not only a sufficient Strength and Resistance, but will take an exceeding fine polish, and better receive and retain the proper Figure or Form, that is given to them, whereby they may be easily passed into the Bladder.

Use of the
flexible Ca-
theter.

VIII. Some Surgeons^b think it best to have many Apertures in the curve Part of the Catheter, the better to facilitate the Exit of the Urine: but two, near the Extremity of this Instrument, are very sufficient, and will generally discharge the Urine in a very considerable Stream. More Apertures would probably render the Use of this Instrument not so safe and practicable; especially when the *Corpus spongiosum Urethrae* is distended with Blood, whereby some Part of it may be pressed into the Apertures, so as to wound the Parts, and obstruct the Progress of the Instrument. For this Reason, the celebrated PETIT has recommended Catheters of another Make, without any Apertures in the Sides, as in *Tab. XXVII. Fig. 7.* which, though cried up, and greatly applauded, for a new Invention, by GARENGEOT^c, was long before delineated by DE LA CHAMP^d; though he directs it for removing Caruncles of the

^a *Lib. de Lithiast. Cap. 3. No. 34.*

^b As NUCK in *Experim. Chirurg.* p. 124. and SOLINGEN, in *Chirurg.* Tab. VIII.

^c *Lib. de Inst. Chirurg.* Tom. I. p. 267.

^d In *Chirurg.* p. 322.

Urethra. In this Instrument the Aperture is at the Extremity A, *Fig. 7.* which is shut by a pyriform Button, marked B. When this kind of Catheter is passed into the Bladder, the Handle of the Wire C, is pressed inward, by which Means the Button marked B, is thrust out of the Tube, as is represented at D, in the next Figure: and thus a Passage is given to the Urine. To conclude, the Catheter may be also of Use to inject various Liquors into the Bladder, in several Disorders, when the Tube of this Instrument is fastened to a Syringe or common Bladder, from whence the Injection is to be forced; which has been remarked by ÆGINETA, *Lib. VI. Cap. 59.* An Abscess in the Neck of the Bladder, causing a Retention of the Urine, has been sometimes broke by passing the Catheter, and the Suppression thereby removed. A particular Dissertation on this Operation, intituled *De Catheterismo*, has been published here, at *Helmstadt*, by MEIBOMIUS, *Ann. 1699.*

C H A P. CXXXVIII.

Of CARUNCLES in the URETHRA.

I. **M**EN, who have formerly had a Gonorrhœa, or an Ulceration of the Urethra, frequently meet with extreme Difficulty in voiding their Urine, so that it cannot be discharged without great Pain, and Straining, and runs in a small Stream like a Thread, being sometimes also totally obstructed or suppressed. This Disorder has been attributed by the Physicians of preceding Ages to a Caruncle, or fleshy Excrescence, in the Cavity of the Urethra: till of late SAVIARD, and BRUNNER, a celebrated Physician to the Elector *Palatine*, and DIONIS, in his Surgery, rejecting the ancient Opinion, have deduced it, perhaps with more Reason, from a Cicatrix, rather than a Caruncle, remaining after the Cure of an Ulcer in this Part, which has been occasioned by a Gonorrhœa. Their Opinion is confirmed to be true, in many Instances, of Bodies that have been opened after Death, labouring under this Complaint. Though in many Cases alledged by ARNEAU and PETIT, the Cause of this Disorder has been neither a Caruncle nor Cicatrix, but a Tumor formed in the spongy or cavernous Body of the Urethra itself (in the same Manner as the Membranes of the Nose are tumified in a Coryza) so as to occlude the Passage of that Canal: However, the Experience of one Party may be opposed by the other in this Disorder: they may perhaps both be in the right, as the very same Disease may proceed from different Causes. Though we find BENEVOLUS, a celebrated *Italian* Physician of *Florence*, yet dissenting from both these Opinions. He declares, in an express Treatise on the Subject, that he has always found the Cause of this Disorder to be a Tumor or Ulceration, and Enlargement of the natural Tubercle, in the Prostate, called by Anatomists *Caput Gallinaginis*: but that he could never yet find the Urine obstructed, in this Complaint, from a Caruncle in the Cavity of the Urethra. He always observed the Obstruction to be more or less, in Proportion to the Quantity of Matter lodged in the *Caput Gallinaginis*. He says, the Disorder almost constantly follows a virulent Gonorrhœa, and that both its beginning and latter End are accompanied with discharges of purulent Matter and Fibres with the Urine. For my own Part, I must

must acknowledge there may be Truth on the Side of each of these Gentlemen, though I am not for confining the Disorder to one particular Cause. But which ever Cause, or Opinion, takes Place in this Complaint, it is no great Matter; since the Method of Cure is one and the same in all.

II. The Surgeon may reasonably determine, whether it proceeds from a Caruncle, by the Patient's Relation, and Symptoms of the Disorder. For, in that Case, the Obstruction is not so sudden; but the Urine flows in a small Stream, and gradually lessens, till it is totally suppressed: the Patient is also continually endeavouring to void his Urine, from the Irritation of the foreign Body in the Urethra. Sometimes a slight Fever attends the Complaint. But the Seat of the Obstacle in the Urethra may be nearly determined by passing a Catheter, leaden Probe, or Wax-candle, into that Canal. For wherever the Instrument meets with more than ordinary Resistance, there may be reasonably conjectured to be the Seat of the Complaint. Lastly, as this Disorder is often attended with most violent Pain and Anguish from the extreme Difficulty of voiding the Urine, so as often to hazard, and sometimes totally destroy the Life of the Patient; the Surgeon should be therefore well acquainted with the Methods of relieving one thus afflicted.

III. If the Disorder be of no long standing, and there appears to be no great Stricture in the Urethra, the Surgeon may then succeed, without much Difficulty, by the following Practice. The Patient being seated on a Couch or his Bed, the Surgeon holds the Penis with his left Hand, while with his right he introduces a Probe of Lead or Wax-candle (of about a Foot long, and Thickness of an ordinary, or rather a large Catheter, which has been first dipt in Oil) into the Urethra, until he has arrived at the Obstacle, and passed a little beyond it. This being secured by proper Bandage from falling out, is to remain there for some Days; till by compressing the Obstacle the Urethra appears to be pervious, as usual, or the recent Disorder at least much checked in its Progress. The leaden Probe, or Wax-candle, is to be extracted every Time the Patient wants to discharge his Urine, and then to be introduced and secured again in the preceding Manner, in which it is to be continued, until the Complaint is entirely removed.

Diagnosis.
Method of
removing
slight Caruncles.

IV. But if the Disorder be so obstinate, or inveterate, as not to yield to the preceding Method; it will then be necessary, according to the general Practice, to dress the End of the leaden Probe or Wax-candle with *Vitriolum R. Alum. ust.* or *Præcipit. rub. cum Ung. fusc. vel Ægyptiac.* to be passed into the Urethra to touch the Obstacle. This, according to the general Advice, should be repeated two or three Times in a Day, till the superfluous and morbid Excrecence is corroded and removed by the Applications, and a free Passage thereby made for the Urine. Concerning the Success of which Practice we are furnished with various Instances. But SAVIARD, BRUNNER, BENEVOLOUS, and COLET, who will not allow the Disorder to arise from any Caruncles, or fleshy Excrecences in the Urethra, condemn this Practice, as pernicious, and apt to corrode or ulcerate the Urethra. Nor do I myself approve of it, when there is no Caruncle or Obstacle in the Urethra, but only in such of those Cases, as will not yield to the milder Practice first mentioned. But it may be here necessary to observe, that the Patient should always discharge his Urine, before the leaden Probe or Wax-candle be passed into the Urethra, that it may remain there the longer.

Inveterate
Caruncles.

longer without Extraction, and so more effectually dilate the Parts. And even when a free Passage has been this Way obtained for the Urine, it may be necessary to retain a Tent or Instrument of the like Kind a few Weeks, or at Intervals, in the Urethra, that the Parts lately made pervious, may remain so more effectually and securely. Lastly, BENEVOLUS advises to furnish the End of the Probe with a Piece of *Emplast. Diapalmæ*, that it may more distend and heal the morbid or ulcerated Part of the Urethra than the rest. But I think that Intention may be answered much better, as I have indeed often experienced, by injecting *Aq. Calc. vel Plantag. cum pauco Sacch. Saturni, vel Lapid. medicamentos. Crollii*, which are found extremely serviceable in cleansing and siccatrizing Ulcerations in general.

Treatment
of the more
obstinate
Caruncles.

V. When the Passage of the Urethra is entirely blocked up in this Disorder, so that no Urine can be evacuated; it will then be necessary, if there is no great Inflammation, to seek for Relief from the Catheter. If the Instrument meets the Stricture or Obstacle in the Urethra, it should be strongly, but cautiously, pressed, by twisting it through the same, to break or divide the Caruncle or Cicatrix, and dilate the Parts for a more free Passage. And after drawing off the Urine, a leaden Probe or Wax-candle dipt in Oil, may be introduced and retained in the Urethra, as before, to keep it pervious. But if either the Catheter cannot be passed, because of the violent Inflammation and Pain, or the Urethra can be by no Means opened, so that the Patient's Life is in the utmost Danger; the last and most severe Remedy left, is, to make an Apertion or Paracentesis of the Bladder with the Trocar, either *in Perinæo* or above the *Os Pubis*, in that Part of the Abdomen, where the high Operation is performed for the Stone, which we shall quickly explain at large. The Patient's Life being secured by the Bladder thus opened, and Urine discharged by the Cannula, left in the Bladder; the Surgeon next proceeds to treat the Disorder in the Urethra by the Methods before proposed, until he has rendered the Urethra pervious, and obtained a free and natural Passage for the Urine: after which, the Cannula of the Trocar may be extracted, and the Wound healed.

Inflamma-
tion of the
Urethra,
how to be
treated.

VI. If the Retention of Urine should proceed from an Inflammation of the Urethra, or Neck of the Bladder, and that in a violent Degree; the Surgeon should not then introduce either the Catheter, Probe, or Wax-candle, because either of them will greatly increase the Inflammation, and consequently the Disorder. He should rather bleed the Patient largely, and ply him with discutient Medicines, both internally and externally. Particularly the Parts affected should be treated with discutient Fomentations and Cataplasms, in order to abate the Inflammation and Tumor: and then the Urethra may be compressed, and a Passage made by retaining a Wax-candle, leaden Probe, or the Catheter, for several Days in the Urethra. But when the Inflammation of the Urethra is slight, the Urine may be immediately drawn off by the Catheter, without any farther Apparatus.

Some neces-
sary Obser-
vations.

VII. It is a necessary Caution, with regard to the Wax-candle, which is to dilate and open the Urethra, that it be not protruded too far, or thrust into the Bladder itself. For in that Case, some part of the Wax may be separated, and stay behind in the Bladder, where it will form the Basis of a future Calculus or Stone. When the Difficulty of discharging the Urine proceeds from some Disorder

Disorder in the Bladder itself, as an Excrescence, Abscess, Ulcer, an Induration or Callosity of its Neck, or in the Prostate, it is but seldom that the Patient can find any Relief from the Hand either of the Physician or Surgeon. For the leaden Probe, Wax-candle, or use of corroding Medicines, are here not only useless, but pernicious. On the contrary, when the Urine is obstructed by some Tumor, Ulcer, or Cicatrix in the Urethra only, the best Method of relieving the Patient will be by the leaden Probe or Wax candle dipt in Oil. Though a Cicatrix in the Urethra is more difficult to be removed this way, than a Tumor or Ulcer; we are at present unacquainted with better Means of dilating and opening the Urethra: and that this Method will often succeed very well, even in a Cicatrix, is confirmed by Experience, as well as the Authority of BENEVOLOUS.

C H A P. CXXXIX.

The Method of extracting a CALCULUS in the URETHRA.

IN Patients subject to the Gravel, or fabulous Concretions, we often meet with a Calculus or small Stone, obstructing the Urethra, so as to deny any Passage to the Urine, and often exciting the most excruciating Pains, as well as occasioning a total Suppression of the Urine. This is a deplorable Case for the Patient; to relieve which, the Physician or Surgeon should endeavour to extract the Calculus without delay. The Seat of the Calculus in the Urethra is various, being sometimes at its beginning, in the Sphincter or Neck of the Bladder, behind the *Scrotum*, in *Perinaeo*; and sometimes in the Middle of the Urethra, or else near its Extremity in the *Glans Penis*. Sometimes, again the Calculus is included in a particular kind of Sacculus or Expansion of the Urethra; which has been observed by LE DRAN (*Tom. II. Obs. 79.*) and DENYS (*Obs. Chir. p. 144.*) mentions a like Case. In the Year 1737 I also found two *Calculi* contained in this kind of Sacculus at the Bottom of the Urethra before the Scrotum, from whence I cut them out. Which is indeed an extraordinary Case, and the two *Calculi* I have represented in *Tab. XXVII. Fig. 16, 17.* But the particular Part of the Urethra, in which the Calculus is lodged, may be known without much Difficulty, from the Seat of the Pain, by feeling and by probing with an Instrument.

The Method without cutting.

II. As the Seat of this Disorder is various, so also is the Method of treating it. It may, in the first Place, be proper to try the Efficacy of Diuretics internally, with the Use of Fomentations, Cataplasms, Glisters, and bathing externally, continued for some time. But if they prove insufficient, a Quantity of Oil of Olives or sweet Almonds may be injected into the Urethra, to lubricate its Surface, together with that of the Calculus, and facilitate its Discharge: to promote which, the Patient may also sit in a Semicupium or Bath, made with emollient Herbs. Some make a Ligature upon the Penis, behind the Calculus, and by strongly inflating the fore Part of the Urethra, they dilate it, so as to make way for the Calculus to come forwards, and be discharged.

This

This Practice is by PROSP. ALPINUS^a said to be very common and familiar with the *Ægyptians*.

The cure
by cutting.

III. If the Calculus resists all those Means, and the Suppression of Urine, with the other Symptoms, increase; it will then be necessary to try a more severe, but effectual Means for its removal by the Knife. If the Calculus is perceived to lodge in the Neck of the Bladder, it may be extracted by a *Section in Perinæo*, where the Stone is perceived by the Touch. But if the Patient will not submit to the Operation, the Calculus may for the present be pushed back by the Catheter into the Bladder: though the Operation, in my Opinion, is much preferable, because the Stone will otherwise grow much larger in the Bladder, and subject the Patient to greater and perpetual Disorders. If the Stone should stick so fast, that the Catheter cannot easily repel it; or if the Surgeon, for the fore-mentioned Reason, is unwilling so to do; it may be extracted by Incision, or the Operation for Lithotomy termed *Apparatus minor*, described in the following Chapter: *viz.* by inserting one Finger into the Anus, to hold the Calculus firm in its place, and making an Incision upon it, large enough for its Extraction. If the Calculus is lodged near the Glans, the best Method will be to inject Oil into the Urethra, after the external Applications before-mentioned have been applied some Time to the Part: And thus by relaxing, lubricating, and gently pressing with the Fingers, to which we may add Suction, in Infants, the Calculus may be often happily discharged, without running the Hazard of a Wound, Cicatrix, and Fistula in the Urethra, from the Operation^b. If the Calculus stops near the external Orifice of the Urethra, it may be then extracted by a Hook, a Pair of Pliers, or an Ear-pick. See *Tab. VI. Fig. 14.* But if those Instruments prove insufficient, it may be proper to try that described and recommended by MARIANUS for the same Purpose, as in *Tab. XXIX. Fig. 7.* the Part or Eye marked A, dipt in Oil, is to be cautiously protruded into the Urethra beyond the Calculus, so as to intercept or catch it; after which, it is to be drawn out together with the Calculus, by the Handle B. If through the Violence of the Inflammation, or Largeness of the Stone, all these Means prove ineffectual; there is then no other Method of relieving the Patient, but by the Operation, as TULPIUS and GARENGEOT also affirm. The Extremity of the Urethra in the Glans is therefore to be divided with a Pair of Scissars, and the Calculus pushed out, by introducing a Probe or small Hook; and then the Parts wounded are to be washed with Wine, and dressed with some vulnerary Balsam. A remarkable Instance of a Stone extracted from the Urethra is to be seen in SCULTETUS, *Obs. 66.*

When the
Calculus is
in the Mid-
dle of the
Urethra.

IV. When all the Means now cited prove without Success, as they frequently do, when the Calculus lies in the Middle of the Urethra; there is then no other way left to save the Patient, and relieve him from his Disorder, than by opening the Urethra, and making an Incision through it with the Scalpel upon the Body of the Calculus, enlarging it sufficiently upward and downward for the Extraction of the Calculus. More particularly, thus: The Skin of the Penis

^a In *Medicina Ægyptiorum*, Lib. III. Cap. XIV.

^b Instances of Stones extracted by these Means, may be seen in V. HORN's *Microtec.* and TULPIUS, *Obs. 8. Lib. III.* An Example of a Calculus extracted by Pliers, see in SCULTETUS, *Obs. 63.*

is to be drawn tense, either forwards, as CELSUS^a advises, or backwards, according to WIDENMANNUS^b; and the Glans being either covered with, or denuded of its Præpuce, a Ligature is made upon the Penis behind the Calculus; left by the Pressure of the Surgeon's Hands it should be forced farther into the Urethra. The Surgeon then presses his left Thumb upon the Calculus, that it may neither slip backward nor forward; while with his right Hand he makes a longitudinal Incision on one Side of the Urethra, large enough to extract the Calculus, either with his Fingers, or Instruments, viz. a Pair of Pliers, Probe, or Hook. After the Stone is extracted, the Skin of the Penis is let loose, and the Wound dressed with some vulnerary Balsam, a Plaster, &c. If the Incision be very long, it is adviseable to insert a leaden Cannula or Tube into the Urethra beyond the Wound, to receive and discharge the Urine, that it may not pass through the Wound, whose Agglutination and Cure would be very much retarded by the Acrimony of the excrementitious Liquor, and possibly degenerate into a callous Ulcer. The Wound may be also preserved from the Urine, by directing the Patient to drink but very little, a few Days before and after the Operation. The Incision is directed to be made laterally, because the Wound in that Position is not so apt to receive Injury from the Urine in its Passage, as it would, if it had been made in the Bottom of the Urethra. It would have been dangerous to have directed the Incision in the upper Part of the Penis, because then the *Corpora Cavernosa* must have been wounded, the Consequence of which might be a fatal Hæmorrhage, or other malignant Symptoms. ALBUCASIS, one of the best *Arabian* Physicians, advises to break the Stone, when it sticks in the Urethra, by boring it with an Instrument, which he delineates, when it cannot be pressed out by the Fingers. PAREY, and others, propose the same Instrument. But such an Instrument can hardly be used without greatly injuring the Urethra in boring the Calculus. If such an Instrument should not succeed, ALBUCASIS then advises to make a Ligature upon the Penis on each Side the Calculus, that it may not move either backward or forward: after which it is to be extracted by Incision^c.

V. We have already explained the usual Method of dividing the Urethra by Incision, for extracting the Calculus. It now remains for us to describe a new Method, invented by a celebrated Surgeon of *Paris*, named THIBAUT, to prevent a Fistula in the Urethra, and described by GARENGEOT. It is briefly this. He holds the Penis in his left Hand, and makes an Incision first laterally through the Skin, and then above through the Urethra, which is first freed from the *Corpora Cavernosa Penis* by a Scalpel. The Urethra is divided by a longitudinal Incision upon the Calculus, under the *Corposæ Cavernosæ*. And after extracting the Stone by a Hook or Pliers, the Wound is dressed up with some Balsam, scraped Lint, Compress and Bandage. Thus they assert, the Wound in the Urethra will heal much sooner, as being covered with the *Corpora Cavernosa Penis*.

THIBAUT's
Method.

VI. When these Calculi are included in a particular kind of Sacculus, I think the best Method is to make a lateral Incision in the Part most convenient for

When the
Stone is in-
cluded in a
Sacculus.

^a Lib. VII. Cap. 26.

^b In Lib. German. de Lithotomia, Pag. 58 and 59.

^c Vide Opera ejus, Part. II. Cap. 61.

their Extraction. And thus I took out the two Calculi before-mentioned, N^o 1. figured in *Tab. XXVII. Fig. 16. and 17.* by making an Incision sufficiently large. I then treated the Cavity of the Sacculus first with digestive Ointments, and then with corroding Medicines, (such as *Merc. præcipit. rub.* and sometimes, even *Lapis Infernalis*) compleating the Cure with *Bals. Capiv. & Emplast. agglutinant.* But a Wound in this Part is not easily to be healed, as may be learned from the 79th *Obs.* of LE DRAN, where almost every Artifice was used in vain. *Vid. TULPII Obs. L. III. Cap. 8. & ROONHUYS, Obs. 27.*

C H A P. CXL.

Of Lithotomy, or cutting for the Stone in Males, particularly by the old Method, termed Apparatus Minor; where we shall also propose something concerning Nephrotomy.

I. **L**ithotomy, or cutting for the Stone, sometimes called *Cystotomy*, from the Greek, *Κύστις*, *Vesica*, is an artificial Opening or Incision made into the Bladder, for the Extraction of some offensive concreted or indurated Body. But when the Stone is cut out of the Kidney, which very rarely happens, the Operation is then termed *Nephrotomy*; which we shall also presently consider in this Chapter^a. This Operation is rendered necessary, because there is no other Method, that we are yet acquainted with, of extracting a Calculus, when it is too large for the Urethra; causing extreme Pain, Inflammation, Ulceration, and a Strangury, or a total Suppression of the Urine, followed with Convulsions, and sometimes a miserable Death. I am sensible, that many Physicians, and others will have it possible to dissolve, break, or otherwise diminish and expel the Stone in the Bladder by internal Medicines: and I myself have given a remarkable Instance, in favour of this Opinion, in the *Philos. Transact.* N^o 417. p. 13. the greatest Part of the Fragments of which Stones I have now by me. But we have never yet been so happy, as to find a Medicine that will certainly dissolve the Stone in all Patients, in any reasonable Time; and the Success attributed to some famous Nostrums has been frequently owing more to Chance, or other particular Incidents, than the Medicine itself. Nor am I sensible of any other certain Method of relieving the Patient from a large Stone, than by the Operation. And if such a Dissolvent was known, there is no doubt but the Rich and Great, who are well disposed, would be at any Expence for so general a Good: an Instance of which we have had lately, though without its good Effect. Nor do I know, that the *Ægyptian* Method of inflating the Urethra to discharge the Stone in the Bladder, was ever tried with

^a Though the Bladder and Kidneys are more subject to calculous Concretions than other Parts, yet we are assured by Experience, and the many Instances cited by the medical Writers of Observations, that Stones have been found in all the other Parts of the Body: of which we have a large Number of Examples collected and published by CRELLIUS, in a Pamphlet, intituled, *Marmorea memoria Seligmanni. Lipsiæ, 1708.* But I think they should be always extirpated, when practicable, as they excite Pain, and other bad Symptoms.

Success in *Europe*, as some ^a would fain persuade us it may. But for the Operation of Lithotomy itself, it is so difficult and dangerous, that it has been with Reason ordained among the Ancients to be the entire Profession of one Physician, free from other Studies and Practice, that he might be the more expert in this Art ^b. For if the Structure of the Bladder, and its true Disposition with regard to the adjacent Parts, be not first well known, and the Surgeon expert in the Enchiresis, or the necessary Arts to be used in cutting, and in extracting the Stone; it is very possible, that the Patient may through such Defect lose his Life in the Operation.

II. We are assured from Experience, that Children are more subject to the Stone than Adults: and that the Children of Poor People have it oftner than those of the Rich. Because those of the poor eat more plentifully, and of a grosser Food, which is not so easily digested: hence the Blood is filled with a grosser Chyle, whose Parts will be more apt to run into Cohesions in all the secretory Vessels, and particularly those of the Kidneys, whence the Stone in the Bladder. In Children the Original of the Stone is generally in the Bladder, without any preceding Pains in the Kidneys. But in Adults the first Rudiments of a Calculus are generally some previous Obstruction, fabulous Concretion, or an Inflammation in the Kidneys. But as to the long Train of Causes, to which many of the Moderns attribute the Origin of the Stone in the Bladder, such as living too much upon Cheese, plentiful drinking of Rhenish Wine, &c. they are either too remote to be well known, or too uncertain for the Physician to have any Dependence thereon. The Stone then, is usually first formed of a very few Particles in the Kidney, which sliding through the Ureter into the Bladder, attract similar Particles from the Urine retained there, until it at last advances to the Weight of many Ounces, and sometimes to several Pounds^c, changing the Name of Gravel for that of the Stone in the Bladder. For while the Concrete remains in the Kidney, it is termed the Gravel or Stone in the Kidney; which, when it is of a very considerable Size, can be removed by no Means whatever, unless it should occasion an Abscess in the Loins: which being opened, either naturally, or by the Scalpel, the Stone may be then extricated. This last way is termed Nephrotomy. But there are several Methods for extracting the Stone in the Bladder by Lithotomy, when it is not of an extraordinary Size. Sometimes there is but one Stone in the Bladder, and sometimes more, to above twenty, thirty, or forty^d. Some Stones of the Bladder are smooth and polished; others are rough and shard pointed: Some are soft and friable, like Mortar; others are very hard and solid, like Pebbles or Flint.

Origin of
the Stone.

III. Before the Surgeon proceeds to the Operation, he should be well satisfied of the real Existence of a Stone in the Bladder: because the very same

Signs of the
Stone in the
Bladder.

^a PROSPER ALPINUS, in particular, in his *Medicina Ægypt.* p. 104.

^b See the Oath of HIPPOCRATES; and CELSUS, *Lib.* VII. *Cap.* 26. ÆGINETA, *Lib.* III. *Cap.* 45. *Lib.* VI. *Cap.* 60.

^c Instances of which may be seen in GREENFIELD's Treatise of the Stone and Gravel, DENYS, CRELLIUS, and others.

^d As in GREENFIELD and RUYSCH, *Obs.* I. p. 2. in both which Cases there were extracted forty two Stones.

Symptoms are often occasioned from some other cause, as a Tumor, Inflammation, Abscess, or Ulcer in the Bladder, or its Neck. And it would be both cruel and imprudent to subject the Patient to so severe and dangerous an Operation, without absolute Necessity. To perform the Operation on a Patient, who has no Stone, would be to shew his own Ignorance, or an Intention to deceive the Patient. To be assured therefore of the Stone in the Bladder, the Surgeon should attend to the following Signs, viz. the Patient usually feels a Pain, Heat, and Itching in that Part of the Bladder where the Stone is lodged. Sometimes it is with great Pain and Difficulty that he discharges his Urine: Sometimes it drops involuntarily. It is generally pale, turbid, and of a bad Smell, partly with a mucous Sediment at the Bottom of the Vessel, and sometimes accompanied with a purulent Matter, or with Blood, when the Stone is rough and sharp pointed. To these we may add, that an uneasy Sensation and Itching is felt by the Patient in all the Parts betwixt the *Perinæum* and Extremity of the *Glans Penis*. Upon which account, Boys afflicted with the Stone, are continually pulling their Præpuce, as it gives a little Ease to their Pain, so that their Penis becomes by that Means extended much longer than usual. But all the Signs now mentioned are both uncertain and inconstant, as all of them may arise equally from an Inflammation, Abscess, Ulcer, or Scirrhusity in the Neck of the Bladder or the prostate Gland, as also from too great Acrimony in the Urine, and other Causes. There is a ready Method of discovering the Stone, more certain than any of the preceding, used formerly by the ancient Physicians, and at present by itinerant Lithotomists. This is by introducing one or two Fingers into the Anus of the Patient, standing or laying down: pressing the other Hand against the Abdomen, immediately above the *Os Pubis*, by which Means the Bladder may be explored by the Fingers *in Ano*, from the Weight and Hardness of which, they certainly conclude that there is a Stone in the Bladder. But even this Method, though it be not contemptible, is by no Means to be relied upon as infallible: because we find by Experience, that the Surgeon may be this way deceived, by mistaking a scirrhus, callous, or other Tumor in the Bladder, Rectum, or Prostate, for a Stone, which appears to the Finger, in this Method of searching, much in the same Manner. There is therefore no other certain and infallible Method of being assured that there is a Stone in the Bladder, than that of searching with the Catheter: the Method of passing which Instrument through the Urethra into the Bladder, for this Purpose, we have before described in *Chap. CXXXVII*. For the Hardness or Resistance, and Collision or Sound, afforded by the meeting of the two Bodies, are a certain Proof, not only of the Existence of a Stone, but also a pretty sure Mark of its Size, Solidity, and Disposition of its Surface. If the Catheter immediately hits upon it, and constantly touches it, it is a Sign of a large Stone: whereas if it be some Time before you can touch the Calculus with the Catheter, and do not easily meet with it again, it is a Sign of Smallness. However, we are obliged to confess, that even the Signs afforded by the Catheter, are sometimes liable to deceive us in forming a Judgment concerning the Stone in the Bladder. For (1) the Hardness or Resistance sometimes perceived by this Instrument, is not from a Stone, but some Excrescence, Tumor, or Induration, in part of the Bladder itself. And then (2) a small Stone may be concealed from the Catheter in

some

some Recess or Cell in the Bladder (see *Tab. XXXI. Fig. 1, 2.*) so that it cannot be well touched. And lastly (3) there are Cases, which frequently occur, where the Catheter cannot be pressed into the Bladder, being prevented by the Inflammation, or some other Accident. So that the Surgeon is obliged to search by introducing his Finger *in Ano*, by which Means the Size of the foreign Body may be also pretty well discovered.

IV. When we are assured by the Signs now mentioned, that there is a Stone Prognosis. in the Bladder, so large, that it will not pass through the Urethra, but fatigues the Patient with the most grievous Symptoms^a; there is then but one certain, though a severe Method of removing the Disorder: *viz.* by the Operation of Lithotomy, all internal Means being either useless or uncertain. If the Severity of the Disease therefore brings the Patient to a Resolution to undergo the Operation, it should be a Matter of the last Importance with a prudent Surgeon, to be previously satisfied, with regard to the Probability of his Success or Miscarriage in the Operation, from the various Circumstances of the Case; lest he should meet with unexpected Death instead of a promised Recovery. For notwithstanding we at present possess many Advantages over our Ancestors in this Operation, by new Improvements in Instruments, and the Methods of using them; the Operation of Lithotomy is still very dangerous, though the Patient does not run so great a Hazard of his Life, when of a good Habit, as formerly. We may observe, that it is a great Disadvantage to the Patient to have a Stone that is very large, and rough surfaced, or sharp pointed. Such is the Size, sometimes, of the Stone in the Bladder, that we are assured by many Instances, that it could by no Means be extracted in the Operation^b. A Stone of a moderate, or even a large Size, with a smooth Surface, may be extracted with a great deal more Ease, than one that is very small, as it is a Difficulty to lay hold of the last. The Stone in the Bladder is usually larger or smaller, in Proportion as it has continued there a longer or shorter Time; increasing gradually, by small and rough Grains of saline and earthy Matter, or by smooth Lamellæ, or Coats, over each other, like an Onion. Such therefore do not consult the Advantage of themselves, or others, who endeavour to delay and put off the Operation; especially when the Stone appears already to be sufficiently large: for by such Delays the Stone enlarges, so as to render the Operation much more dangerous and difficult. When a Patient has been worn out by the Stone, or some other Disorder, then also the Operation is not very likely to succeed. The Patient may perhaps die in the Operation. Lastly, the more Strength and better Habit the Patient has, and the smoother-surfaced, and more moderate sized are the Stones, though several in Number; the greater Prospect there is of a ready and happy Cure by the Operation. With respect to the Age of the Patient, though CELSUS is of Opinion that none should be undertaken before the ninth or after the fourteenth; many famous Physicians maintain the contrary: and they have Ex-

^a If the Patient be not troubled with any violent Symptoms from the Stone, he may, by palliating Medicines, often retain it as long as he lives, without much Injury; as may be seen in ROSSETUS, WEDELII *Diff. de Lithot.* & *Ephem. Nat. Cur. Cent. IX. Obs. 2.*

^b Thus the celebrated Archiater and Professor BORICHIUS died in the Operation, because the Stone could not be extracted, it was so large. See his Life in *Conspect. Scriptor. Chemic.*

perience on their side. I myself have cut very young Children, and particularly one of two Years and a half, with success. I likewise succeeded in a young Man of Nineteen, whom I cut in the Year 1745. Nay it has been practised happily even upon antient Patients, of a good Habit and Constitution; as ÆGINETA, SCHACCHUS and others assure us.

Prerequisites
to the Ope-
ration.

V. When the Operation is therefore resolved upon, after duly weighing all the forementioned Circumstances; there are then three Things necessary to be considered by the prudent Surgeon. (1) What is to be done before the Operation is undertaken or begun, (2) what is necessary to be done in the Operation itself; and lastly, (3) what after the Operation is concluded. Before the Operation is begun, he should judiciously determine (1) which of the Methods is to be used, as there are several; and (2) fix a convenient Time for the Operation; before which he should (3) prepare the Patient by a proper Regimen, or Medicines: (4) he must provide the necessary Apparatus of Instruments; and lastly (5) he is to dispose and secure the Patient in a proper Posture for his Work.

The several
Methods of
Lithotomy
distinguished

VI. First, with regard to the Method of operating to be chosen by the Surgeon, it is to be observed, that there are chiefly four Ways of performing Lithotomy, for the Stone in the Bladder. The first and most ancient is, from the few Instruments employed, distinguished by the Title of *Apparatus Minor*. And as this Method has been received and approved of by CELSUS, and GUIDO CAULIACO; it is by some denominated *Methodus Celsiana, vel Guidoniana*. The second Method of Lithotomy is, from the Number of Instruments used therein, termed *Apparatus Magnus*, or MARIANUS's Method. If we respect the Date of them, the first is by some termed the *Old*, and the second the *new Method*; as having been contrived within these two Centuries: Whereas the old Method had been extant for above two thousand Years. The third Method of performing Lithotomy is termed *Apparatus altus*, or, sometimes, *Sectio Hypogastrica*. In this the Incision is made in the lower Part of the Abdomen, in the Anterior Side of the Bladder, immediately above the *Os Pubis*: whereas in all the other Methods, the Incision is made in *Perinæo*, betwixt the *Anus* and *Scrotum*. This third Method is also, by some, denominated *Franconica*, from PETER FRANCUS, who practising it on an emergent Occasion, is said to be the first Author of it, though he afterwards dissuaded from the Use of it. The fourth and last Method of cutting for the Stone, which is also the most Modern, having been invented towards the End of the last Century, is termed the *lateral Operation*, or *Methodus fratris Jacobi*, as being invented by a French Monk named FRERE JAQUES, who first practised it with surprising Success, and great Applause. It is also (but seldom) termed RAW's Method. We shall treat of each of these Methods in their distinct Chapters following, but I have not had Opportunity of experiencing all of them in my own Practice.

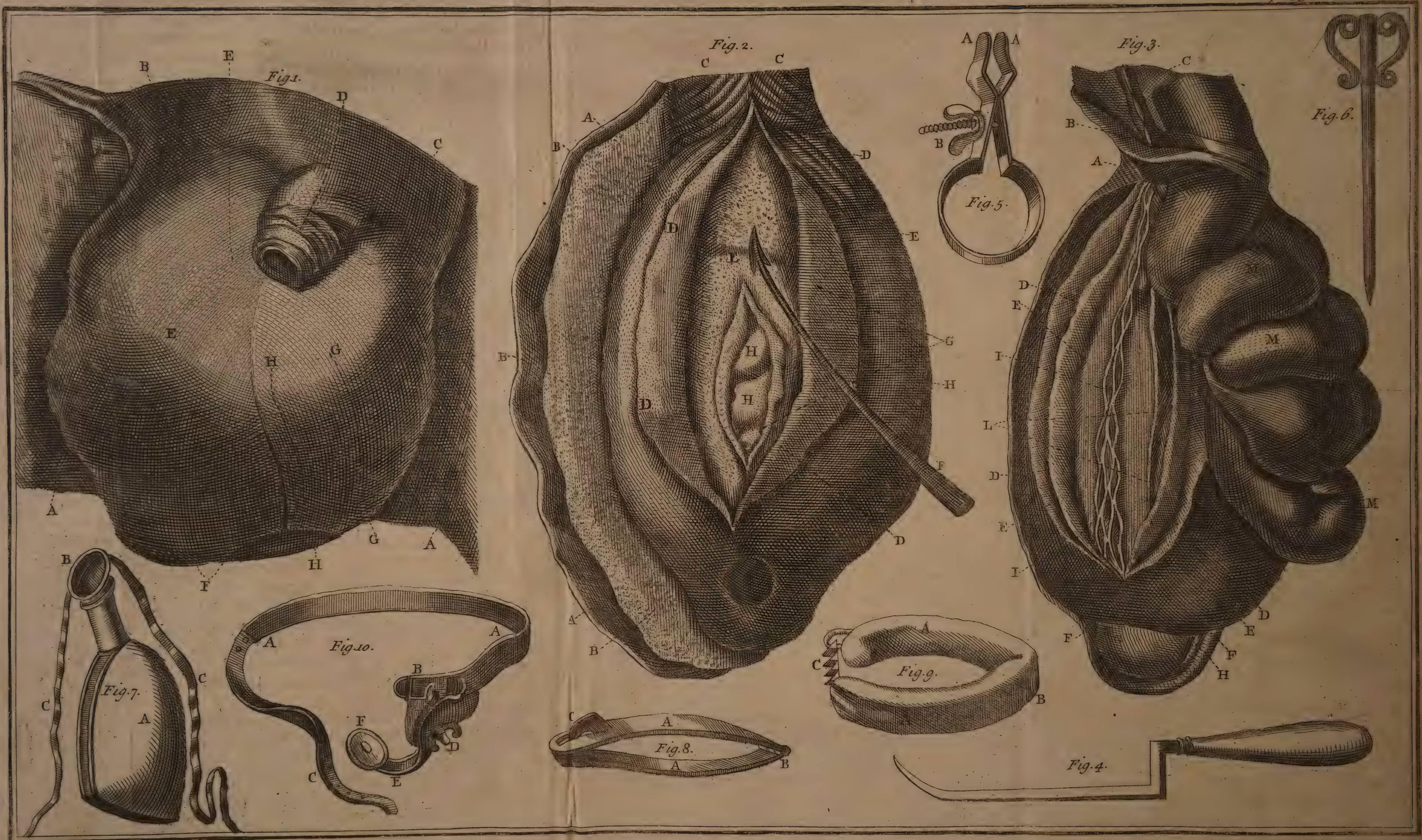
The Time
convenient
for perform-
ing Litho-
tomy.

VII. We before observed that a convenient Time should be fixed for performing the Operation of Lithotomy; which may vary according to Choice or Necessity. It is to be observed, that the Operation may be performed at any season of the Year with us in *Germany*: for in the Summer Time the Air is more temperate or less hot than in other Countries, and in Winter, the Cold-

ness

1870
The first of the year
The first of the year
The first of the year
The first of the year

The first of the year
The first of the year
The first of the year
The first of the year



ness of the Air may be removed and moderated at Pleasure by our Stoves. Though it must be confessed that Spring and Autumn seem to be more favourable for the Operation than other Seasons: So that when there is no urgent Necessity, the Case may be deferred until then. But it would be base in a Surgeon to neglect the Patient on this account, when there is a real Necessity for his performing the Operation before; the Patient being all the while tormented, and perhaps lost, for want of Help, of which we have had many Instances.

VIII. With regard to the Method of preparing the Patient for the Operation, he should be directed to live on a spare Diet for several Days^a; and if he be an Adult, of a full Habit, he should be bled, which may be omitted in Boys: though in both, the Body is to be kept open with laxative Medicines. The Evening before the Operation, or the Morning of the same Day, a purging Clyster should be administered to the Patient; that he may not foul and obscure the Surgeon's work with his Fæces, which are generally discharged in cutting. On the contrary, if the Patient be weak, and low, he should be supported by a nourishing Diet, and proper Medicines. Three or four Hours before the Operation, it may not be amiss to give him, according to the *French* Custom, some strong Broth, or a couple of Eggs poached soft, to be drank in some Wine; or if he be a Child, one Egg may suffice. And lastly, it may be proper to shave off the Hair, if there is any, in *Perinæo*.

Method of
preparing
the Patient.

IX. The Apparatus of Instruments, Bandage, and Dressing, for the Operation of Lithotomy, varies according to the several particular Methods of performing it; each of which we shall describe in their proper Places. But here we shall only consider what is necessary for the *Apparatus Minor*. Such as the particular kind of Bistoury or Scalpel, exhibited in *Tab. XXVII. Fig. 8.* or a Razor instead of it; which, together with the Hook (*Fig. 10.*) or a Pair of Pliers, will be sufficient for the Purpose. But from *SCHACCVS*'s Time, who wrote in the Year 1596, the more experienced Surgeons admit the Forceps into their Apparatus: which they always have in Readiness, in Case the Hook and Fingers are not sufficient for the Extraction. And indeed this Addition is a great Improvement of the ancient Method. For the Dressing, the T Bandage should be at Hand, to be applied in the Manner represented in *Tab. XXXVIII. Fig. 16.* or *Tab. II. Fig. b.* To this may be added a thick and square Compress, of about four Fingers breadth, some scraped Lint and styptic Powder, or rather highly rectified *Sp. Vini*, which is much better for stopping the bleeding, when excessive. On the same Account it may be also necessary to have some crooked Needles and Thread, in Readiness for taking up the larger Vessels, which may happen to be divided.

The Apparatus of Instruments and Dressing.

X. We have endeavoured to represent the most proper Posture, for the Patient to be secured in for this Operation, when an Adult, in *Tab. XXIX. Fig. 5.* As likewise *Fig. 9.* and *10.* of the same Plate: in the first of which Figures is represented the Situation of an adult Patient for Lithotomy, according to *ALGHISH*, a little different from the Method of *TOLET*: in the last is

Posture of the Patient.

^a *CELSUS* recommends to the Patient a wholesome and thin Diet for some Days preceding the Operation: and that he should exercise himself frequently with moderate Walking, to facilitate the Stone's Descent into the Neck of the Bladder.

exhibited one of the open Ligatures, with which RAW used to fasten the Patient's Hands and Arms together. The Posture of the Patient is described more at large in the fourth Number of the ensuing Chapter. But if a Child is to be cut for the Stone by this Method, he is to be tied in the Posture just referred to, or secured in the same Manner by two Assistants, the strongest of which should be seated on a high Chair, holding upon his Knees a Pillow or Cushion, covered with a Linen Cloth three or four Times double, hanging over his Knees down to his Feet. Upon this Pillow the young Patient is to be seated, and secured, as we have represented in *Tab. XXVIII. Fig. 1.* from TOLET. The Lad thus placed, if he be strong, another Assistant may hold his Arms, so that he cannot move: or if he be of a lusty Stature, or fourteen Years of Age, he may then be placed in the Posture before represented in *Tab. XXIX. Fig. 5.* which is the seventh Table of TOLET.

The old Method of Lithotomy, by the Apparatus Minor, described.

XI. The Lad being thus most commodiously placed, the Surgeon then proceeds to perform the Operation; which in the old Method of Lithotomy by the *Apparatus Minor*, is done in the following Manner: First, the Surgeon dips the Fore-finger^a of his left Hand in Oil, and then introduces it into the *Anus* of the Patient, rightly disposed and prepared, pressing it forwards towards the *Os Pubis*; while with his right Hand he presses backward upon the lower Part of the Abdomen, on the Bladder, immediately above the *Os Pubis*. Having felt the Stone, he thrusts it to the left Side, of the *Perinæum* near the *Anus*, and there holds it in his Fingers in such a Manner that it forms a visible Tumor in *Perinæo*. (See *Tab. XXIX. Fig. 3. A.*) This done, he makes an Incision upon the most prominent Part of the Tumor in *Perinæo*, with the Scalpel or Bistoury held in his right Hand, cutting down successively through the Integuments upon the Calculus; and enlarging the Wound longitudinally, he at last divides the Bladder itself, in the same Direction, (BB) sufficient for the Extraction of the Stone. It is necessary that the intervening Parts betwixt the Knife and Calculus be cleanly divided, without leaving any Adhesions; lest the Extraction of the Stone should be by that Means hindered, as it otherwise would be, especially when a rough one: as also to avoid giving the Patient more than necessary Pain, and prevent a consequent Inflammation, from lacerating and confusing the nervous Parts. The Bladder thus divided, and the Knife laid aside or given to the Assistants; if the Stone be small, it may be thrust out at the Wound by the Fingers in *Ano*: or if it be large and rough, its Extraction may be effected, partly by the Pressure of the Fingers in *Ano*, and partly by applying the Hook B. See *Fig. 6. Tab. XXIX.* But if the Stone should slide back again into the Bladder, or stick fast in the Wound, it may be then drawn out by the Forceps.

What is to be done after the Operation.

XII. When the Stone has been thus extracted, it will be necessary to introduce the Finger, a Catheter, or Probe into the Bladder (*Tab. XXVII. Fig. 11.*) in order to make a diligent Search, whether there are any other of those Con-

^a In CELSUS's Method, the Surgeon introduces two Fingers into the *Anus*. ÆGINETA was the first, who directs the Use of the Fore-finger only; and that very properly, especially in very young Patients, to prevent any Injury of the Intestine. *Lib. VII. Cap. 60.* He maintains likewise that this Operation may be performed on Adults as well as Children; and, instead of the lunated Wound of CELSUS, he recommends an oblique Incision; which is much easier.

cretions yet remaining in that Receptacle. For it is very frequent to find other Stones in the Bladder, when that extracted is of a smooth and polished Surface, or when the Stone is broke in the Extraction. If there be any remaining, they should be therefore carefully extracted by the Fingers, a Hook, Forceps, or Pliers, for this Purpose; and when all is found clear, the Operation is concluded, and the Patient put to Bed. But for the subsequent Dressing, Regimen, and future Treatment of the Wound; they may be managed according to the Directions we shall give in explaining the modern Method of Lithotomy, by the *Apparatus Magnus*, in the next Chapter.

XIII. It is to be observed that this ancient Method of Lithotomy, which we have been now explaining, being very simple in itself, is chiefly practised by Mountebanks and ignorant Operators; being quite laid aside by all our modern and skilful Physicians and Surgeons, who have more dexterous and successful Methods of cutting. However, I think this Method not only very practicable in Boys from ten to fourteen Years of Age, which is the Time limited by CELSUS and ALBUCASIS for this way of operating, but also in younger Patients, and even in Adults, especially of a short Stature or lean Habit of Body; because in them there is no great Difficulty in bringing the Stone to its proper Place in *Perinæo*. And the Simplicity of the Method is rather a Recommendation than a Disparagement of it to us: especially as it has been so long practised, with very good Success, in young Subjects, not only for many Ages past by our Ancestors, but also by several, in our modern or present Practice; and I myself and others have performed great Cures by it, in Adults, and even in some that were advanced in Years. See N^o. 4. of this Chapter. For it has certainly this Advantage over the *Apparatus Magnus* of MARIANUS, and the *lateral Operation* of RAW and JAMES, that it can be performed with the fewest Instruments, and often with nothing more than the Knife. In this way too the Urethra is not injured by passing the Catheter, nor the Bladder pinched by the Use of the Forceps or Pliers; whereas they are often very much hurt and lacerated by the Instruments used in the other Methods. The Stone is also readily found, and more easily and speedily extracted than in the Operation of MARIANUS, and the lateral Method of Lithotomy, in which the Stone sometimes cannot be found by the most expert Masters. To which we may add, that in this way the Stone serves as a Guide and Foundation for the Surgeon to cut upon; and was what gave Birth to the lateral Operation now in Vogue. For CELSUS tells us (*Lib. VII. Cap. 26.*) that the Wound is to be made in the Integuments near the Anus, down to the Neck of the Bladder. And ALBUCASIS says the Stone is to be protruded to the Bottom of the *Os Ischium*, where the Incision is to be afterwards made. I have therefore practised this Method of operating, with Success, on young Subjects for many Years past; and at Times still continue to do the same now. Also the experience MARIANUS would persuade us still to use this Method in Children, upon many Accounts, in his *Italian Treatise* of the principal Operations in Surgery. This Operation is also most eligible in some Cases for Adults: as when the Urine is suppressed by a Calculus sticking in the Neck of the Bladder, where it may be perceived, forming a Tumor in *Perinæo*, and can be neither discharged by Medicines, nor safely repelled by the Catheter. (See *Chap. CXXXIX.* preceding.) It may be also

Our Judgment on this Method.

allowed of in some other Cafes, where the Stone gravitates towards the *Perinaeum*, forming a Tumor, in which it may be fenfibly perceived. Otherwise the *apparatus Minor* is allowed, even by CELSUS and ALBUCASIS, its ancient Patrons, to be not without Danger in Adults; and efpecially in thofe of high Stature; becaufe in them there is great Difficulty in bringing the Stone to its proper Place in *Perinaeo*.

Concerning
Nephroto-
my.

XIV. Laftly, as there are many Cafes in which a Stone in the Kidney can by no Means be refolved or removed by Medicines, and the Patient being continually in the moft extreme Torture, is defirous by any Means to be freed; it may not be inconfiftent with our Design in this Place, to refolve the Queftion, whether a Stone in the Kidney may not be cut out in fuch a Cafe. This is a Subject feldom treated of in Books of Surgery; and which I chufe to treat of in this Place, as the Operation may be performed by the *Apparatus Minor*, either with the Scalpel alone, or with the Hook and Forceps. The generality of thofe who have faid any thing upon the Subject in their Writings, think it a Propofal too dangerous to be practicable, and therefore treat it with Neglect: when at the fame Time there are extant many Arguments both from Reason and Experience, which recommend fuch a Practice to be abfolutely neceffary, efpecially under particular Circumftances. For we have many Inftances of Patients who have been freed from the Stone in the Kidney, by a Wound in that Part, received accidentally in the Back^a; and that in fome Cafes without any dangerous Symptoms. Among other Inftances which have come under my own Obfervation, I fhall only mention a late one, of a man who was wounded by another with a Knife, upon the Region of the right Kidney, in his Back, in the Year 1735, in fuch a Manner that Blood, and bloody Urine, was voided in great Plenty for feveral Days through the Wound, and through the Urethra: but after he was tranfmitted to my Care at *Helmftadt*, he was happily cured within the Space of four Weeks. It is therefore moft certain, that Wounds of the Kidneys are not always mortal, as fome have imagined, but frequently curable; efpecially thofe inflicted on the Back, without penetrating into the Cavity of the Abdomen. And HIPPOCRATES^b, though he interdicts his Pupils from performing the Operation of Lithotomy, does yet direct them, in treating of Diforders in the Kidneys, *to make an Opening where they are elevated and tumified; that after extracting the Gravel, and difcharging the Matter, they may be healed with Diuretics. For by fuch an Opening or Incifion there may be Hopes of a Recovery; otherwife the Patient is a dead Subject.* And in the fame Book (*Cap. XVI. tit. 8.*) he fays, *When there is a Suppuration of the Kidney, and it forms a Tumor near the Spine; in that Cafe a deep Incifion is to be made upon the Tumor near the Kidney, or (as he fays in another Place, Cap. XVIII. tit. 17.) into the Kidney itfelf.* From whence it appears, that he did not think an Incifion in this Part fo greatly to be feared, as a Wound in the Bladder. ROSSETUS alfo, and the accurate Anatomift RIOLAN, and others, are induced, by many Reasons, to think that Nephrotomy may be often practifed with Succefs; if the Incifion be made in that Part where the Calculus is perceptible, taking care to avoid

^a Many of which are collected by WEDELIUS in *Differtat. de Lithotomia*, Jenæ 1714. See alfo SCHENCK. *Obferuat.* and BOHN. *de vuln. leth.* p. 157.

^b *Lib. de Intern. Affect.* Cap. XV. Tit. 19.

wounding the emulgent Artery, Vein, or the Ureter, and to prevent the Wound from penetrating into the Cavity of the Abdomen. But Nothing can be more reasonable than to perform Nephrotomy, when we are directed to it by Nature, pointing out the Place, by a Tumor and Abscess formed in the Loins from a Calculus in the Pelvis or Kidney. In such a Case we are also supported by the Advice and Authority of SCHENCKIUS, WEDELIUS, and MEEKREN; together with LAVATERUS, formerly an eminent Physician and Surgeon of *Helvetia*, with whom I amicably cohabited for some Time, in the Year 1710, he then practising Surgery at *London* with great Applause. He at that Time told me that he had not only performed this Operation with Success in the above-mentioned Case, but had also publickly declared (in the last Page but one of a Treatise published in the Year 1708, at *Utrecht* on the Rhine, *de Atriteis & Hypoßpadiceis*) “ I perform the Operation of Nephrotomy, on either of the “ Kidneys, when Nature directs to that Practice by forming an Abscess.” There is therefore no apparent Reason why this Operation should be condemned, under the forementioned Circumstances, as it is by a great many. I should rather advise, according to my own Practice, never to omit Nephrotomy, when Nature thus points out the Road to it: since the Life of the Patient may be frequently not only this way preserved, but also freed from the Torture and excruciating Pains excited by the Calculus, which may be thus freely extracted by the Fingers, a Hook, or a Pair of Pliers. For more on this Subject consult FONTANUS, *exempl. 42. fol. 117.* HILDANUS, *Cent. IV. Obs. 44.* TULPIUS, *Lib. IV. Obs. 28.*

C H A P. CXLI.

Of Lithotomy by the Apparatus Major.

I. **F**ROM the preceding Account of Lithotomy by the *Apparatus Minor*, The Reason of its Invention. it appears to be practicable with Ease and Expedition. But there are many Cases, especially in Adults, as MARIANUS and HILDANUS have rightly observed, where that Method would be both dangerous in its Consequences, and difficult in the Performance, or even impracticable. For when the Stone is unequal and rough-surfaced, (which is often the Case, and is sometimes judged to be so from the Frequency of bloody Urine, and the most painful Sensations; and sometimes by introducing the Fingers into the Rectum, or the Catheter into the Bladder) the Patient is not only tortured with extreme Pain by forcing it to the Side of the *Perinæum* in the Operation; but the Roughness of it will also frequently occasion a violent Inflammation and consequent Gangrene. The Inequality of the Stone also frequently causes the Incision upon it to be so uneven as to render its Extraction thereby difficult; so that many bad Consequences must necessarily follow. To which may be added, that the Surgeon is sometimes liable to hurt the Rectum, or his own Fingers^a; whence it will

^a Though this Accident sometimes happens to an imprudent and careless Surgeon, it may be generally avoided by the more dextrous and expert.

be very difficult to sustain and feel the Stone, so as to cut upon it. If the Patient also be large and corpulent, the Magnitude of the Bladder and its Distance from the Anus may render it difficult to protrude the Stone to the Side of the *Perinæum*: and it will be still much more difficult to retain it firm in that Situation, because of the Slipperiness of the Bladder and Rectum. To which, if we add the Smoothness of the Stone's Surface, and the Aptness of the Surgeon's Finger to be cramped, or to be tired, and incapable of holding out, it will evidently appear that this Method of Lithotomy must be in many Cases both hazardous and impracticable. Not to insist upon the Possibility and Danger of wounding one of the *vesiculæ Seminales*, on the left Side, so as to impair in a great Measure the Patient's Sufficiency for Procreation. These and other Inconveniences, especially that the *Apparatus Minor* is only practicable in Infants, and that Adults of a larger Size could not conveniently be cured by it, has induced the Surgeons of the sixteenth Century, about the Year 1520, to invent another Method of cutting for the Stone, with new Instruments; which was then, and has since continued to be practised with great Success. Inasmuch that the most expert Surgeons, especially those of *France*, have generally preferred it to the more simple and ancient Method, by the *Apparatus Minor*; except, as we before intimated, when the Calculus is lodged in the *Perinæum*, or sticks fast in the Neck of the Bladder or posterior Part of the Urethra, so that it can neither be repelled back again, nor discharged forward. The Invention of this new Method of Lithotomy by the *Apparatus Major*, is ascribed to a celebrated *Italian* Physician of *Cremona*, FRANCISCUS DE ROMANIS, vel ROMANO. Whose Method was afterwards improved and published by one of his Scholars, MARIANUS SANCTUS, in a Treatise of a barbarous Stile *de Lapide vesicæ per incisionem extrahendo*. Venet. 8^{vo}. 1535. and afterwards at *Paris*, 4^{to}. 1540. Since when it has been denominated, from its Improver and first Describer, MARIANUS's *Method of Lithotomy*; and from the larger Number of Instruments used in it, the *Apparatus Magnus*, or *Major*. But of late, since we have had other Methods introduced, it has been termed the *vulgar* or *old* Method.

The Occasion of inventing this Method.

II. The first Invention of this Method seems to me to have arose from an Observation, how easily large Stones are frequently voided from Women, either naturally, without any Assistance, or by Art with an extracting Force. For ROMANUS, its first Author, considering the Shortness and great Dilatability of the Urethra in Women, giving an easy Passage to a Stone, either spontaneously, or with the Help of Instruments, imagined that if an Opening was made into the Urethra of Men, near the Bladder, so as to leave the intermediate Part of it as short as in Women, that then it might be dilated, and the Stone extracted with equal Ease*: for to cut into the Bladder, was at that Time esteemed mortal, and therefore criminal, from the Authority of HIPPOCRATES, *Aph.* 18. *Lib.* VI. and CELSUS *Lib.* VI. *Cap.* 26. And if we rightly consider the Case, the male Subject is, by this Operation, with regard to the Urethra, converted into a female, and so treated as such. For in this Method, a longitudinal

* Though M. FALCONET, a Physician at *Paris*, in a Dissertation on the lateral Operation, thinks it was not the Author's Intention to cut into the Urethra, but into the Neck and Bladder itself. Which Opinion is most probable, the Reader may presently judge.

Incision is made in *Perinæo*, extended from the *Scrotum* towards the *Anus*; which, as it were, resembles the Entrance of the *Vagina*, or at least serves instead of it in the present Case: the *Urethra* is then opened in *Perinæo* from the Letter D to F or I, *Tab. XXIX. Fig. 1.* So that there remains but a short Part of the *Urethra* intire, between the Lips of the Wound and the Bladder, as from I to L, like as in Women: which Part being sufficiently dilated with proper Instruments, the Stone may be extracted by convenient Hooks or Pliers out of the Bladder. To answer this Intention, it was therefore necessary for the Inventor to contrive a Set of Instruments, by which the whole might be dextrously performed. Accordingly he first invents a grooved Catheter to make an Incision safely in the *Urethra*; afterwards Directors and Dilators, to make way into the Bladder; and, lastly, Forceps for the Extraction of the Stone. All which were at that Time, as appears from MARIANUS, but very imperfectly and indifferently fitted for their Offices, as we usually find in the Beginning of almost all Inventions: but in Process of Time they have received various Improvements and Advantages, so that at the present Day they seem to have acquired a great degree of Perfection. Though some of the Instruments employed in the *Apparatus minor* may be also used in this Method.

III. In performing Lithotomy by the *Apparatus major*, the following Instruments are chiefly necessary. First, Catheters, made of Silver or Copper, of various Sizes and Diameters, according to the different Age and Make of several Patients, in order to search for, or find out the Stone, as we before directed in *Chap. CXXXVII. § III.* See also our Explanation in *Tab. XXVII. Fig. 2, 3, 4, and 5.* in treating of the *Apparatus minor*. But in this Apparatus there are also required grooved Catheters made of Steel of various Sizes, according to the Age or Bulk of the Patient. See *Tab. XXVII. Fig. 12, 13, 14, 15.* To these we may add the Scalpel, *Fig. 8.* or particular Kind of Knife for dividing the Parts by Incision in Lithotomy; which, at the Time of using it, should be wrapped up in Linen in the Manner represented in *Fig. 9.* leaving its Point only uncovered. Two ensiform Directors or Conductors, (*Tab. XXVIII. Fig. 2. and 3.*) one of which has a Beak, marked A, and called *male*; the other being termed *female* B; and the Handles of both are represented by the Letters CC. Some prefer the more simple and excavated Conductor of HILDANUS, *Fig. 4.* termed a *Gorgeret*^a by the *French*; which is approved of as more commodious by some, and disapproved of by others. It will be also necessary for the Lithotomist to be provided with a peculiar Sort of Forceps, *Fig. 5, 6, 7.* of different Sizes and Figures, some being straight at the Mouth, as *Fig. 5.* others incurvated, as *Fig. 6.* together with a Kind of Hook represented in *Tab. XXVII. Fig. 10.* which is smooth on the external Surface next the Bladder, but rough and unequal on that Part, which is to intercept the Stone. To this should be also added a Kind of oblong Spoon, *Fig. 11. AA.* being furnished with a Button or round Head B, to be used instead of a Probe: the Instrument is by some termed *Lapidillum*, and by MARIANUS *Verriculum*, because it serves to extract the small Fragments of Stones from the Bladder. Lastly, in order to dilate the Wound, when the Stone is exceeding large, it is the Practice of some to use an

Necessary
Apparatus
of Instru-
ments for
this Method.

^a Which has been long ago described and figured by P. FRANCUS in *Lib. de Herniis.*

Instrument called a *Dilatator*. Of this Instrument there are several kinds; but as it is seldom used at present, I have only exhibited one of them in *Tab. XXVIII. Fig. 8.*^a The several Instruments now mentioned are by some fixed in a sort of a Case or Pouch hanging before 'em, and fastened round their Waste, as in *Tab. XXIX. Fig. 9. lit. H.* Others place them in a Dish full of warm Water, in such Order as may be most commodious for using them in the Operation; or else they only dip the Instruments in hot Water before they are thus disposed for Use. It will be also necessary to be provided with a Sponge and warm Water, lest there should be occasion to clear away the Blood from the Wound, after making the Incision: And the Surgeon should be defended with an Apron and Sleeves to keep his Clothes clean. The Apparatus for dressing may be the same as we before directed for the *Apparatus minor*; viz. scraped Lint, the T Bandage, and a thick square Compress, upon which may be laid the Bistoury, or Scalpel, for the Operation, as in *Tab. XXIX. Fig. 9.* Add to these, some highly rectified Spirit of Wine, or styptic Powders, for restraining the Hæmorrhage, if the Flux of Blood should be too considerable; also some small crooked Needles and Thread, for taking up the bleeding Arteries, according to the Advice of Mr. CHESELDEN: and lastly, a Cup with Olive-oil, in which some of the Instruments are to be dipped, in order to lubricate them, and make them pass into the Bladder with more Ease.

AN EXPLANATION of the TWENTY SEVENTH PLATE.

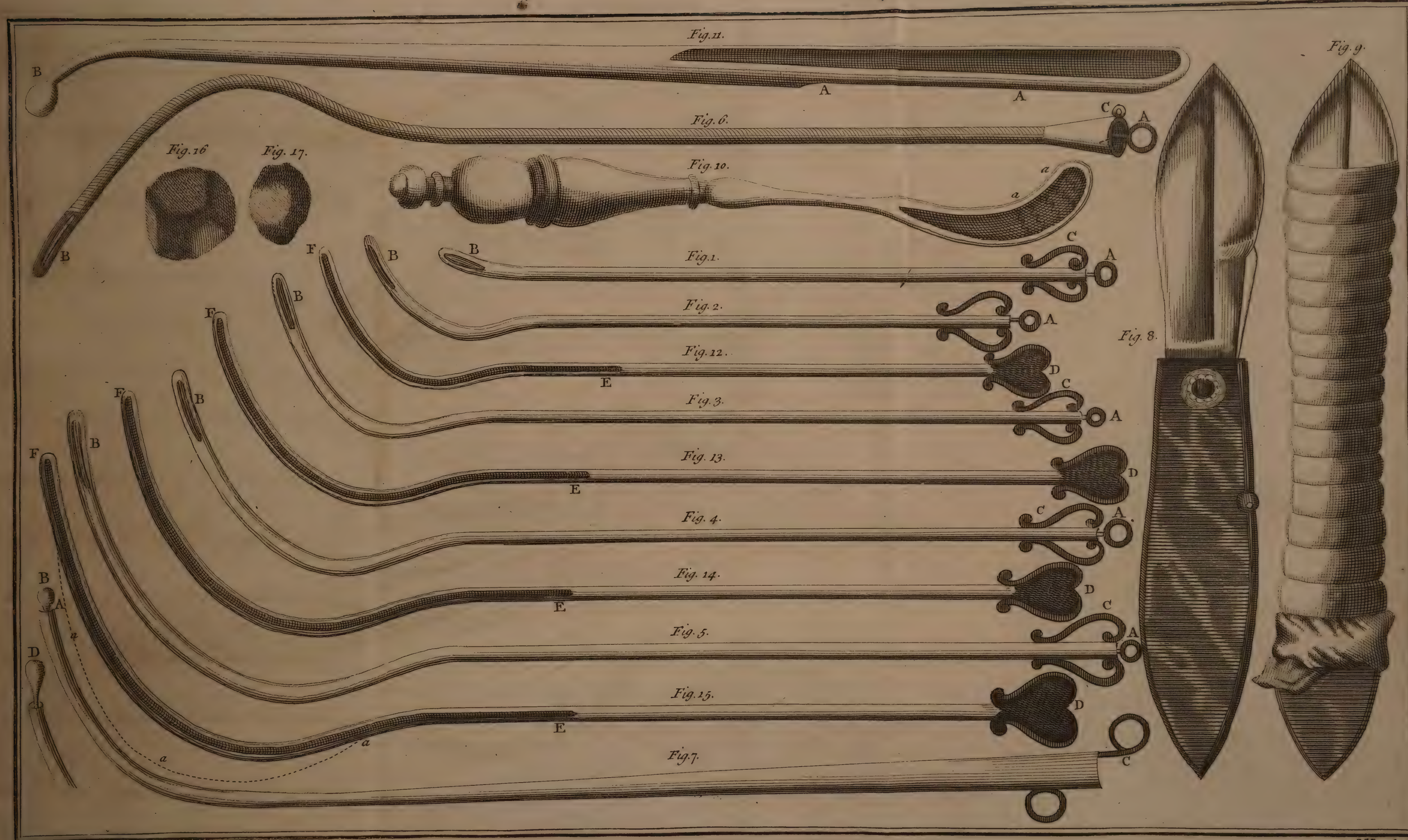
Fig. 1. Represents the Copper or Silver Pipe called a *Catheter*, which is chiefly used in Women for discharging the Urine in a Suppression, and to search for the Stone.

Fig. 2, 3, 4, 5. Are Silver Catheters of various Sizes, to be applied for the same Purposes in male Subjects, according to the different Age and Size of the Patient's Body. The Letters AA denote the Handle of the concealed Silver Wire, whereby it is to be drawn out of the Cannula, when that may be necessary; BB the two oblong Apertures at the Extremity of the Instrument, which admit the Urine to be discharged; CC the Handles of the Catheters.

Fig. 6. Represents a Silver Catheter which is flexible, which is sometimes very necessary and convenient to be left in the Bladder and Urethra to discharge the Urine, when another Catheter must be introduced several Times successively, as when the urinary Passage is totally occluded by some Calculus, &c. in which Case the flexible Catheter may prevent an Inflammation of those Parts, by repeated Introductions of the other Instrument. The Letters A, B, C, denote the same here as in the preceding Instrument.

Fig. 7. Represents a Silver Catheter of another kind, which is without the Lateral Apertures; having only one opening at its End marked A, which is shut by the pyriform Button marked B, which is in a manner the End of the included Wire. If the Handle of the Wire C be pressed forwards, the Button comes out in the manner represented by D in the adjacent Figure, by which

^a Others may be seen in MARIANUS, ANDREAS A. CRUCE, PAREY, P. FRANCUS, TOLET, DIONIS, LE DRAN, &c.



means the suppressed Urine will enter by the Mouth of the Catheter, and be conveyed out of the Bladder.

Fig. 8. Is a large Scalpel, or Bistoury, opened and naked, such as hath been hitherto most in Use for the Operation of Lithotomy; it is by some termed *Lithotomus*.

Fig. 9. Is the same Instrument, furnished with a Piece of narrow Linen wound round it, in such a manner as not to leave an Inch of the Edge uncovered, sufficient to make the Incision.

Fig. 10. Is the Hook which is sometimes necessary for extracting the Stone in the several Methods of Lithotomy; it being furnished with small Teeth in its concave Part, for the more firmly holding or retaining the Calculus.

Fig. 11. A Steel Instrument having an oblong, but narrow Spoon at one End; and being round at the other, is also furnished with a round Button, which may perform the Office of a Probe and Director, which is often used with various Intentions for the Stone in the Bladder by the Lithotomists.

Fig. 12, 13, 14, & 15. Denote Steel and grooved Catheters, which are commonly used in cutting for the Stone by the *Apparatus major*, that the Knife may be guided into the Groove. DD represent their Handles, EF their Grooves.

Fig. 16, 17. Are two Stones of an unusual Size, which I successfully cut out of a Sacculus, or Hernia, in the Urethra before the Scrotum.

IV. The several necessary Instruments being thus provided, the next Business is to dispose and secure the Patient in a proper Posture for the Operation; that he may not injure himself, and obstruct the Operator by his irregular or obstinate Motions. In most Hospitals, where this Operation is very frequently performed, they are provided with a particular kind of Table for this purpose, represented in *Tab. XXVIII. Fig. 9.* the Manner of placing the Patient upon which, is represented from the *Italian* Lithotomist ALGHISH, in *Tab. XXIX. Fig. 9.* Sometimes a proper Chair is used instead of the Table, one or two of which is figured by TOLET in his Treatise of Lithotomy, but are not very often used at the present Day. But if one of these Chairs is not at hand, a common oval or square Table of about four Feet long, and three broad, will be sufficient for that Purpose, placing thereon a kind of Seat to be raised or depressed to support the Patient's Back, as in *Tab. XXVIII. Fig. 9.* The Patient is to be placed in such a Manner on the Edge of this Table marked B, that he may sit as in a Chair, his Back being supported by the inclined and moveable Part of the Table marked C. His Thighs are then to be bent and distended in such a Manner that his Heels may touch his Buttocks AA; and his Knees being divaricated, his Hands are held fast about his Hams as RAW advises, or near his Ancles, to which it may be proper to secure them by Ligatures in such a Manner that he cannot easily move himself (see *Tab. XXIX. Fig. 9. & 10.*) as we shall relate more particularly in explaining that Table.

Posture of the Patient.

V. It is generally necessary to provide three or four strong and courageous Assistants to secure the Patient firmly in a proper Posture for the Operation. See *Tab. XXIX. Fig. 9.* Two of these Assistants represented by CC, are to se-

Posture of the Assistants.

cure.

cure the Patient's Legs on each Side, in such a Manner as to hold his Foot fast in one Hand, and his Knee in the other, drawing it at the same Time to one Side. The third Assistant is to stand behind, and keep the Patient down on his Back close to the Table: and the fourth is to stand on the right Side of the Patient, or on the Table, in such Manner as to hold up the Scrotum with one Hand, and to hold the Catheter, upon Occasion, with his other. A fifth Assistant may stand on the right Side of the Surgeon, that he may hold in Readiness, give and receive the several Instruments necessary for Lithotomy. Sometimes three Assistants will be sufficient for this Purpose, disposed in the Manner represented by *Fig. 9. Tab. XXIX.* from ALGHISH: that is, two Assistants should hold the Extremities on each Side, and the third stride a-cross the Table, so as to hold the Patient betwixt his Legs and thighs; and for the drawing up the Scrotum, &c. as before. At the Extremity of the Table near the Surgeon should be placed a Vessel to receive the Blood and Fæces that may be discharged from the Patient: and near the same should be also placed a Cup of Oil, and a Pan of hot Water to warm the Instruments, and lubricate them before they are passed into the Bladder; as also wash off any Sand or Filth from them, and to cleanse the Wound from its extravasated Blood by means of a Sponge. These several Necessaries being made ready, the Surgeon may then enter on his Work in the following Manner.

The Manner of operating or cutting.

VI. In the first Place the Surgeon is to put off his Coat, if it will be any Incumbrance to him; and having dipped the End of one of the Steel grooved Catheters in Oil, sizable to the Patient, he then introduces it through the Urethra into the Bladder, according to the Directions given in Chap. CXXXVI. § III. and therewith searches a second Time, to see if he can find a Stone: lest the first Tryal should deceive him, as it sometimes does. If then the Surgeon and his Assistants are satisfied of a Stone being concealed in the Bladder, the convex Part of the Catheter is thereupon turned in the Bladder and Urethra towards the left Side of the Perinæum: but the Handle of the Instrument, together with the Penis containing it, is gently inclined towards the right Side or Inguen; in which Posture the Surgeon usually orders it to be held by one of the Assistants, whose Office is to hold up the Scrotum. By this means the convex Part of the Catheter elevates that Part of the Perinæum and Urethra, which are to be divided in the Operation, and renders them sufficiently obvious both to the Eye and Touch. This done, the Surgeon raises the Integuments of the Perinæum with the Fingers of his left Hand, and draws them towards the right Side of the Patient. In his right Hand the Surgeon at the same time holds the Knife bound round with a piece of Linen (as at *Fig. 9. Tab. XXVII.*) in the same Position as we generally hold a Pen in writing, and therewith makes a longitudinal Incision downwards, in the middle of the Perinæum, near the *Raphe*, or Suture, thus dividing thro' the *Membrana adiposa*, till his Finger can perceive the Catheter in the Neck of the Bladder and Urethra; which is then to be divided perpendicularly downward, in such Manner that the End of the Scalpel may pass in the Groove of the Catheter: because in this Method of performing Lithotomy, only the Urethra is to be divided, and the Neck of the Bladder left entire. Thus by passing the Scalpel in the Groove of the Catheter, there will be no Danger of wounding Parts which would be improper to be divided. Some begin

gin their Incision near the middle of the Perinæum, and continue it downward; others make their Incision from below upward towards the Scrotum: but I think the last Method is not so often practised. The external Orifice of the Wound made is to be larger or smaller, in Proportion to the Patient's Habit of Body, and Size of the Stone to be extracted; but it is generally made about two Fingers Breadth in Children, and three or four in Adults: and the Incision in the Urethra, internally, is continued (see *Tab. XXIX. Fig. 1.*) thro' the Bulb E from D, to the Beginning of the Neck of the Bladder F or I^a. But when the Surgeon is going to divide the lower Part of the Urethra, his Hand and Knife are to be inclined; while, according to the Direction of Mess. CHESELDEN and LE DRAN, the End of the Catheter, which had been hitherto pressed downward, is now to be elevated or pressed strongly against the Symphysis, or Angle of the *Ossa Pubis*. By which means the *Urethra* is drawn as much as possible from the *Intestinum rectum*; which, without this Precaution, might easily be wounded. At the same Time Care should be also taken to prevent the Point of the Knife from slipping out of the Groove of the Catheter. Some Lithotomists commit the Integuments of the *Perinæum* to be divaricated by the assisting Surgeon, who holds up the *Scrotum*, holding the Catheter in its proper Direction with their own Left-hand. But in this respect the Surgeon may act as Conveniency and Discretion may direct him.

VII. A sufficient Opening being thus made by Incision, the Knife is then returned by the Surgeon to the Assistant, who first gave it; at the same Time diligently observing the Groove of the Catheter: in which, if it be held by an Assistant, he keeps the Nail of the Fore-finger or Thumb of his Left-hand. The Lithotomist then takes a Male-conductor from his Pouch, or the Hand of an Assistant, and after dipping it in warm Oil, slides the End of it cautiously thro' the Groove of the Catheter into the Bladder: which done, he extracts the Catheter. Some leave the End of the Knife in the Groove of the Catheter, which is in that manner held by an Assistant, 'till they have thereby guided the End of the Conductor into the Groove of the Catheter; because it would otherwise be a difficult Matter, especially in fat Subjects, to pass the end of the Conductor into the Groove of the Catheter, which would be covered and obscured by the Protuberance of the fat. The Male-conductor being thus introduced thro' the Groove of the Catheter into the Bladder, a female Conductor is also introduced upon the former, by its Sulcus B, (*Tab. XXIX, Fig. 2, 3.*) being guided on the sharp Back of the other, so as to pass easily and safely into the Bladder thro' its Neck. This done, the two Conductors are gradually divaricated from each other by their own Handles CC; and the Neck of the Bladder being by that means dilated, a Pair of strait Stone-forceps, which have been first warmed and dipped in Oil, are carefully introduced close shut betwixt the Conductors into the Bladder: by which means the Neck of the Bladder is again in some measure further dilated. My own Practice is to thrust the Fore-finger of my Right-hand, dipt in Oil, betwixt the two Conductors, before introducing the Forceps: thus I gently dilate the Neck of the Bladder, for the more easy Entrance of the Forceps. It is a certain Sign that the Forceps are

What is to be done with the Conductors after the Incision.

^a The Position of the Bladder and Urethra is accurately described for the Use of the Lithotomist by MORGAGNI in *Advers. Anat.* III. pag. 82 & 97.

passed into the Bladder, if you find they will easily open: but if they will not yet open, 'tis a sign they are not in the Bladder, but must be introduced further thro' its Neck. Some of the Surgeons of *Paris* introduce the Fore-finger of their Right-hand into the Bladder, upon the male Conductor, before they introduce the female one; and then, by inverting the Conductor, and turning its Edge downwards, they endeavour to dilate its Neck. But LE DRAN wisely observes, that the strict Neck of the Bladder is so filled with the Conductor, that the Finger cannot be also hastily introduced through it, as some do with Precipitation, without endangering a Laceration, and the most excruciating Pain: and therefore the first Method is, in my Opinion, the more adviseable. Others, again, proceed in a different Method, using only the single cannulated or grooved Instrument, called by the *French* a *Gorgeret*, (*Tab. XXVIII. Fig. 4.*) instead of the two Conductors beforementioned. These, having first made an Incision as before, pass the End of the *Gorgeret* thro' the Groove of the Catheter into the Bladder, as we directed for the male Conductor: only some help forward the Instrument with the Fore-finger. The *Gorgeret* being thus introduced into the Bladder, if it contains any Urine, it runs out thro' the Groove of the Instrument, which is also a sure Mark of its being passed into the Bladder. The Catheter is then taken out of the Urethra, and the *Gorgeret* gently turned round on every Side by the Surgeon, in order to dilate gradually the Neck of the Bladder: then taking the *Gorgeret* by the Handle BB, in his Left-hand, he carefully introduces the shut Forceps with his Right-hand, through the Groove CC, into the Bladder.

LE DRAN'S
Observations

VIII. LE DRAN, who prefers and uses the *Gorgeret* before the other ensiform Conductors, having passed that Instrument into the Bladder, gently thrusts the Fore-finger of his Right-hand thro' the Wound into the Groove of the Instrument; and therewith dilates the Neck of the Bladder for the more easy Passage of the shut Forceps, which he afterwards introduces through the Groove of the same Instrument: though indeed the same Practice was described before LE DRAN by one of my own Pupils^a. But he was probably the first who observed, from morbid Dissections, that the whole Neck of the Bladder was almost constantly slit or lacerated, as well as expanded by the Method of dilating in the *Apparatus major*; notwithstanding it was often attended with no bad Consequences, especially when done cautiously and gradually. For by that means the Forceps not only meet with a more easy Passage into the Bladder, but the Stone itself may be also extracted afterwards with much more Ease, and less Danger. The flitting or lacerating the Neck of the Bladder, and prostate, by a gradual and gentle Dilatation, was the less to be feared; inasmuch as without it there constantly appeared, in the dead Subjects who had suffered this Method of Lithotomy, a more dangerous and dreadful Laceration, occasioned either by the more violent Intrusion of the Forceps, Dilatation of the Parts, or Extraction of the Stone^b.

Lithotomists are not agreed as to all the Parts which ought to be divided in making their Incision for the *Apparatus major*. The Generality of them are for dividing the *Urethra* only, without at all cutting the Bladder itself, or its Neck:

^a ROSA, in Dissert. de Calculo Vesicæ, Argentorat. Ann. 1723.

^b See his Parallel of the different Methods of performing Lithotomy.

in which Opinion we find TOLET, and many others. But we before observed, in § II. of this Chapter, that M. FALCONET is of Opinion, that the Authors of this Method of Lithotomy intended and designed, that the Neck, and even the Bladder itself, should be incised in the *Apparatus major*, as they are usually in the *Apparatus minor*. M. NOEL says expressly, that “the Neck of the Bladder is the Part where the Incision is constantly made in this Operation; and that Brother JAMES’s Method differs from the *Apparatus major* only in the Parts externally divided.” So also we find, that M. ROSA orders the Sphincter, that is, the Neck of the Bladder, to be divided in the *Apparatus major*, p. 23. and SCHAFERUS^a writes, that, in this Method of Lithotomy, not only the Neck, but also Part of the Bladder itself, should be incised.

IX. When the Forceps are introduced into the Bladder, after the Conductors are extracted, they are to be strongly opened several times to dilate the Opening; and then shutting them close together again, the Stone is to be gently searched for^b. While the Surgeon is searching for the Stone with the Forceps, he should keep them shut close all the Time, lest some Part of the Bladder should be intercepted and pinched by them: for which Reason too, the Jaws of the Forceps should be of such a Make, as not to meet close at their Extremity, as may be seen in the Forceps represented in *Tab. XXXI. Fig. 12.* When the Stone is found, the Forceps are to be opened by applying both Hands dextrously, so as to lay hold of the Stone in such a manner, if possible, that one Jaw of the Forceps may be underneath it, and the other above: the Advantages of which have been remarked by LE DRAN (*pag. 65.*) The Stone, being thus held fast in the Forceps, is to be pressed downwards towards the Rectum; and by gradually inclining the Forceps from one Side to the other, it is to be cautiously extracted downward, because the Parts more easily dilate and yield that way than upwards, from the Resistance of the *Ossa Pubis*. Thus the Stone is often easily and speedily extracted, when it is not very large, or rough: but when it is of an unusual Size, or an unequal and prickly Surface, the Task proves difficult. But if the Stone cannot well be intercepted by the Forceps, because of its Concealment in some Cell or Fold of the Bladder, as it frequently happens towards the *Rectum*; in that Case the Surgeon is to introduce the two first Fingers of his left Hand into the *Anus* of the Patient, to thrust the Stone into the Forceps, that it may be well secured in them, so as to be extracted without further Difficulty. But if the Stone adheres to the upper Part of the Bladder behind the *Ossa Pubis*; the inferior Part of the Abdomen is to be pressed downward with the Hand, that the Stone may be more commodiously intercepted and extracted by the crooked or straight Forceps. If the Stone lodges on the right or left Side of the Bladder, it may often be laid hold of, and extracted more conveniently by the crooked Forceps represented in *Tab. XXVIII. Fig. 6.* But to prevent the Stone from being broken by a too strong Compression with the Forceps, it may be proper to thrust the Finger and Thumb of the left Hand on each Side the Stone betwixt the Forceps, to preserve the same: for it is always much better to extract the Stone whole, when that is practicable, than to break it into Fragments. If the Stone cannot be readily found by the Forceps, LE DRAN

Use of the
Forceps.

^a Apud MEYERUM in Obs. Chirurg. de Lithot. pag. 73 & 74.

^b Dissert. de variis Lithotomix generibus. *Argentorat. Ann. 1724. pag. 7.*

takes them out of the Bladder, and introduces his Finger, by which he places the Stone in a fit Position at the Neck of the Bladder; and then, by laying hold of it with the Forceps, extracts the same.

How the
Forceps are
to be managed when
they open
too wide.

X. If the Handles of the Forceps marked DD. *Tab. XXVIII.* are too much divaricated, after laying hold of the Stone, it cannot then be well extracted without great Danger of violently lacerating the Bladder, particularly its Neck, and the prostate Gland. Therefore the Cause of this too wide opening of the Forceps is to be more particularly searched for: which may be best done by introducing the Finger, or, when that is impracticable, the kind of Probe armed with a Button, *Tab. XXVII. Fig. 11, 13.* With this the Lithotomist is to search, betwixt the Jaws of the Forceps, whether or no the Stone, being of an oval or oblong Figure, is not held in the Forceps transversely, or lengthwise. If the Stone be in this Position in the Forceps, it is to be let loose, and again taken hold of by them in its least Diameter; which may be done by the Direction of the Finger, or the forementioned Instrument, whereby it may be extracted with much less Danger and Difficulty than before. But if, notwithstanding all this, the Stone continues to open the Forceps very wide, the Surgeon is then to use his best Endeavours to extract the same. In order to which, he is to take hold of the two Handles DD in his right Hand, and grasping that Part of the Forceps next the Wound with his left Hand, he is then to pull the Forceps and Stone gradually from one Side to the other downwards: because the lower Part of the Wound more easily dilates than the upper, having none of the Resistance of the *Offa Pubis*. But if the Stone proves so large as to resist the Size of the Wound, and all the Surgeon's Endeavours for its Extraction entire, it should then be broke to pieces by a large pair of Forceps with Teeth, represented in *Tab. XXVIII. Fig. 7.* which may be full as large again as the Figure: and thus the Stone may be extracted one piece after the other. But lastly^a, if the Stone is so hard and compact, as well as large, that it cannot be extracted nor broke to pieces by the Forceps, as we are told formerly happened to Professor BORRICHIVS^b: then the Case is deplorable, being generally fatal, as it was to him. A prudent Surgeon will, in such a Case, leave the Stone in the Bladder, and heal up the Wound, or else leave it a Fistula, through which the Urine may be discharged, rather than torture the Patient to no Purpose, by forcing the Forceps to such a Degree, that he dies in the Operation, which was the Case of BORRICHIVS. Some Lithotomists, but few with Success, make use of a steel Instrument to dilate the Wound, commonly termed a *Dilatator*, resembling that in *Tab. XXVIII. Fig. 8.* But the Instrument has not been thought safe and convenient enough to be brought into Use among our modern Lithotomists. For it can hardly ever be used, to make any considerable Dilatation, without violently contusing and lacerating the Parts; which, being very nervous and sensible, the Pain, already very great, becomes still more excruciating, and is often followed with a violent Inflammation, a Gangrene, and a cancerous Disposition, or other most malignant Symptoms. Sometimes the Stone cannot be compressed with Force enough to break it by the Forceps, because it lies too near the Hinge or Flexure of the Instrument, *Tab. XXVIII. Fig. 5.*

^a CELIVS (*Lib. VII. Cap. 26. N. 3.*) tells us, that AMMONIVS was the first who advised breaking the Stone.

^b In the Account of his Life among the more Illustrious Chemical Writers.

Therefore

Therefore it may, in that Case, be proper to press back the Stone nearer to the Extremity of the Jaws of the Forceps, by introducing the button End of the Scoop, *Tab. XXVII. Fig. 11. B.* or in its stead, the fore Finger. To prevent the Forceps from being apt to hold the Stone too near their Hinge, it may be proper to have them made smooth in that Part, having Teeth only at their Extremity, as we have represented in *Tab. XXVIII. Fig. 5. & 6. litt. A & B.* by which means the Stone will of itself slide from the Hinge, and stick only at the Teeth, towards the Extremity of the Forceps. M. FRANCUS DE FRANCKENAU does indeed take notice^a of a Machine that was used by a Lithotomist at the *Hague*, instead of a Forceps for extracting the Stone, which was composed of Whalebone and an Ox's Bladder, whereby he endeavoured to avoid the Injury offered to the Bladder and other Parts by the common Forceps; but he neither describes the proper Size and Structure of the Instrument, nor the Manner in which it was used.

XI. But if it happen that the Stone after a long Search cannot properly be laid hold of, or if it so often elude the Forceps, as not to be extracted in convenient Time (which has been the Case with very eminent and experienced Men; particularly RAW and Friar JAMES) the Patient growing weak he must rest a while to recover his Strength. And if he be seized with fainting Fits, Convulsions, or a Delirium; the Surgeon should for this Time desist entirely, rather than torture the Patient and perhaps destroy him. After he has lain in Bed for some Hours, and been refreshed with strengthening and comforting Medicines, the Operation may be again attempted, the Patient being situated as before. Thus the Stone very often, being propelled in the interim by the Bladder and Urine towards the Wound, is extracted without Difficulty. This is confirmed by the Testimonies of ALBUCASIS, P. FRANCUS, HILDANUS, TOLETUS, and others: and I myself have experienced the same happy Effects. You should never harass the Patient beyond his Strength, lest he die under the Operation.

Other Observations.

XII. When a Stone has been extracted agreeably to the Directions preceding, the Surgeon should then, especially if the Stone has a smooth Surface, introduce his Fore-finger, or the probe End of the Scoop beforementioned, in order to search whether any other Stone or Fragment be yet remaining in the Bladder, which could not well be determined before the Operation. If there be more Stones yet remaining, the Forceps are to be again introduced into the Bladder, either with the Finger, or the Conductors, and the Extraction of them made in the Manner which we have but now explained. And thus the Lithotomist is to continue, till the Bladder is cleared. If Gravel only, or some small Fragments of the Stone be found remaining, they may be more commodiously extracted by the oblong Spoon or Scoop, *Tab. XXVII. Fig. 11. A.* Or, if the Patient be very weak, and almost spent in the Operation, the Expulsion of them may be left to Nature: for the Urine generally discharges and washes out what fabulous Matter and Fragments of the Stone are left after the Operation. When the Bladder has in this Manner been carefully cleansed, it is the Practice of some Surgeons to insert a large Tube, *Tab. II. Fig. P.* either flexible or inflexible: others insert a Tent into the Wound, over which they apply a Plaster, Compress,

What is to be done after extracting the Stones.

^a In Act. Eruditor. Lipsienf. Ann. 1726. pag. 42.

and the Bandage T; thinking by that Means more effectually to cleanse the Bladder from Sand or other Fæces. But it is the Advice of myself and others, with Brother JAMES and RAW, to insert nothing in the Wound, and that for very good Reasons. For without a Tube, Tent, or any thing of the like Nature, the Blood, Sand, and other Fæces are washed freely away by the Urine which flows through the open Wound: whereas they would be retained by the Use of those Things, and the Wound would be probably thereby converted into a Fistula, attended with very bad Symptoms. In extracting the Stone, it sometimes slips out of the Forceps, and lodges in the Wound; in which Case we should immediately endeavour to lay hold of it again without extracting the Forceps; but if they are already out of the Wound, the two fore Fingers dipt in Oil should be instantly introduced into the Patient's Anus, in order to press the Stone towards the Mouth of the Wound, and then to extract it cautiously by the Use of the Forceps or a Hook.

An EXPLANATION of the TWENTY EIGHTH PLATE.

Fig. 1. Represents the Manner in which the Male Child is to be secured for the Operation, according to the Direction of CELSUS and TOLET: which, in my Opinion, seem to be neither very proper nor convenient.

Fig. 2 and 3. Represent the ensiform Conductors, which are, by many Lithotomists, used in the *Apparatus major*, and in the lateral Operation. That at *Fig. 2.* is furnished with a small oblong and obtuse Beak A, and is thereby denominated *Male*; the other at *Fig. 3. litt. B.* has a Groove, and is generally termed the *female* Director.

Fig. 4. Exhibits the concave or cannulated Conductor, called by the *French* a *Gorgeret*, which is by most Lithotomists generally preferred to the two preceding. A is the Beak of the Instrument, which is transmitted through the Groove of the Catheter; BB its cruciform Handle; CC its Channel or Groove through which is passed the Finger, and then the Forceps into the Bladder.

Fig. 5. A *Volsella*, or Pair of straight Forceps for extracting the Stone out of the Bladder (of which kind it is necessary to have some larger) furnished with Teeth within the Extremity of their Mouth.

Fig. 6. A Pair of the same Forceps crooked, serving to take hold of the Stone, when it is lodged on one Side of the Bladder.

Fig. 7. Represents a Pair of large Forceps furnished with large and sharp Teeth of a pyramidical Figure, fitted for breaking large Stones within the Bladder. But the Instrument may be as large again as the Figure, to exert the greater Force.

Fig. 8. Represents the Instrument termed a *Dilatator* by the Generality of Surgeons, being the most simple of the Kind described by any Author, and serving to dilate the Wound made in Lithotomy: though the Instrument is at present hardly ever made use of. The Beak A, like a Crane's Bill, is inserted into the Wound; and the two Arms (BB) being pressed together, the Beak of the Instrument opens by means of the Hinge marked C.

Fig. 1.



Fig. 9.

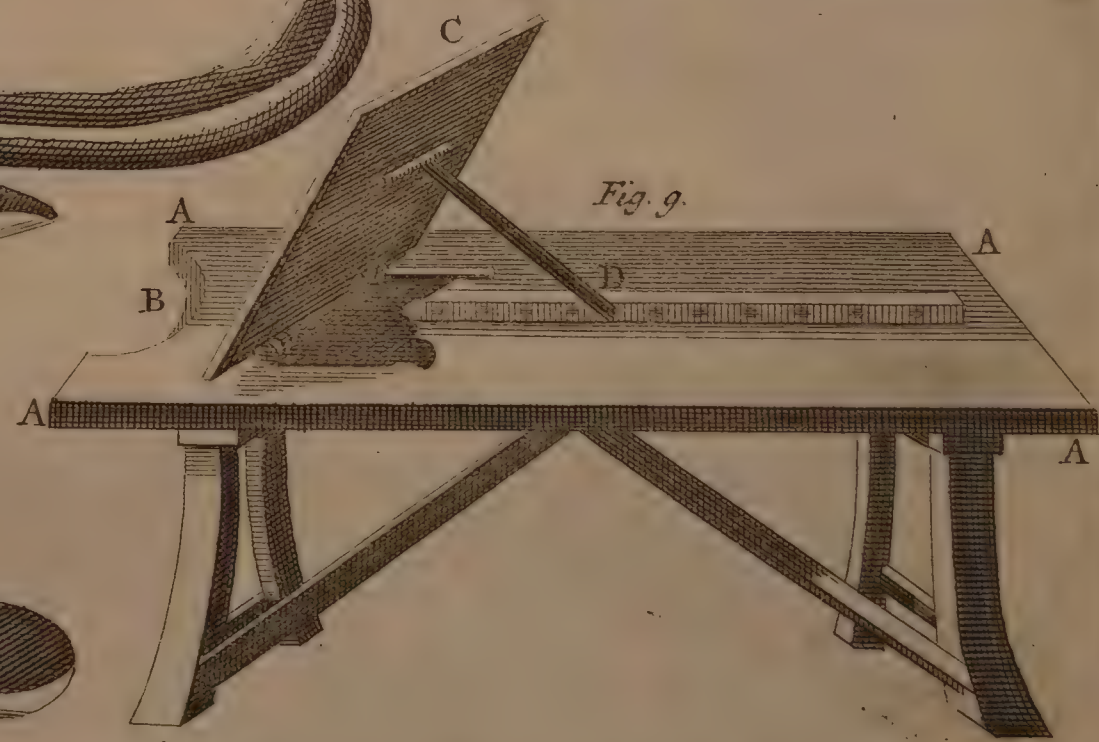


Fig. 5.

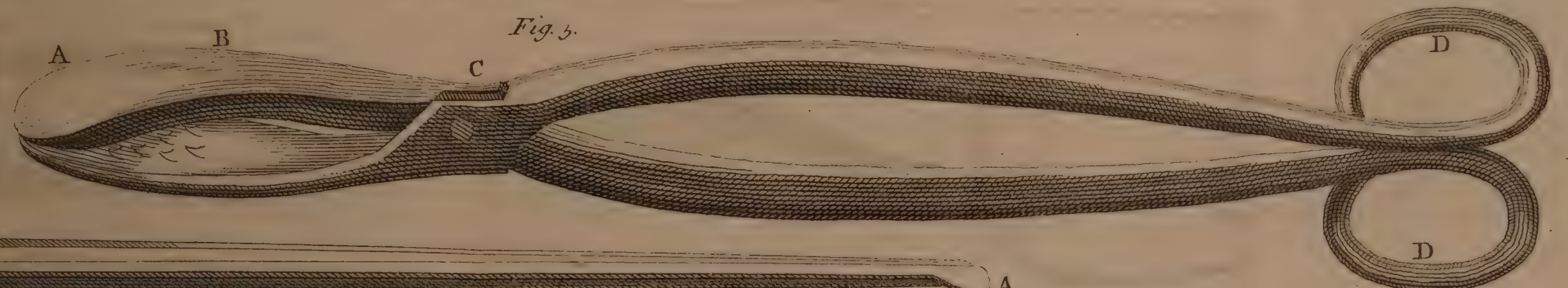


Fig. 6.

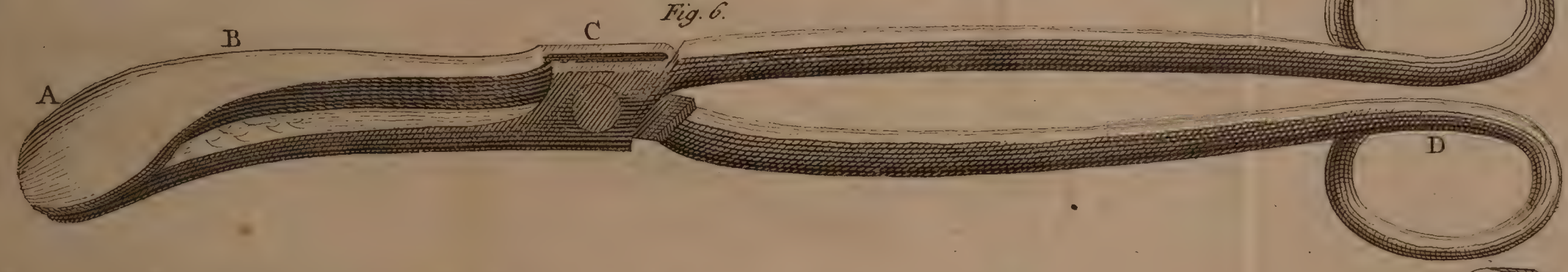


Fig. 7.

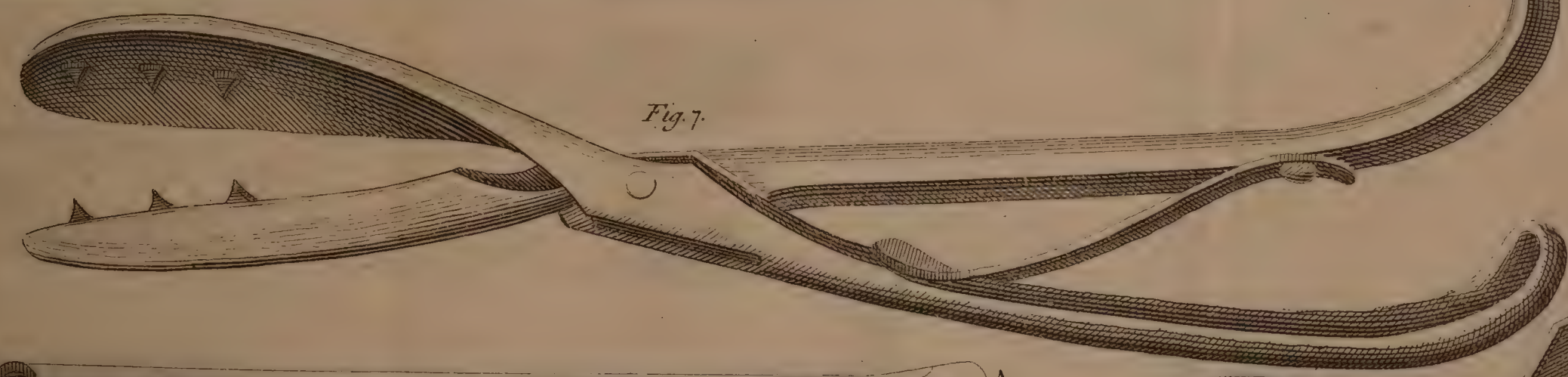


Fig. 8.



Fig. 2.

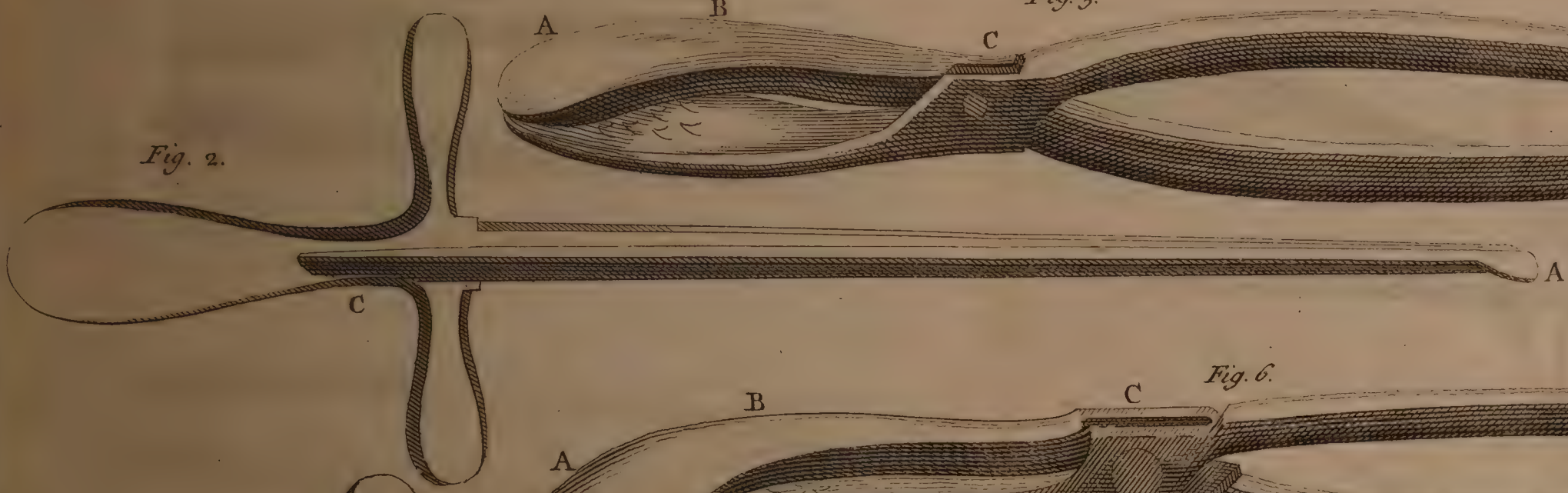


Fig. 3.



Fig. 4.

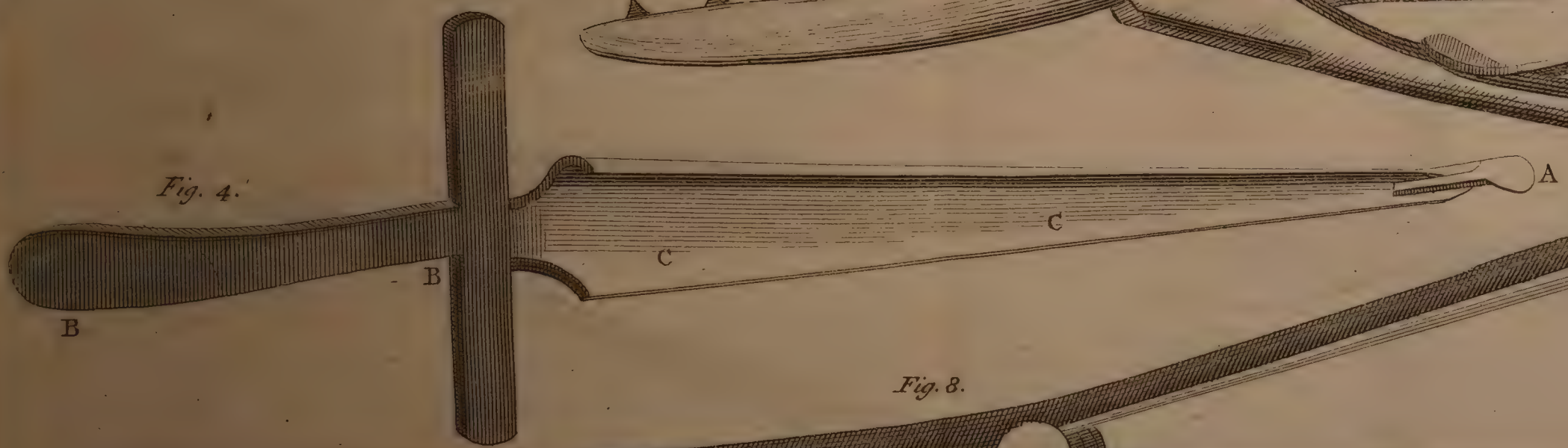


Fig. 9. Shews a commodious Table adapted for performing the Operation of Lithotomy, marked at each Corner with the Letters AAAA. The Letter B denotes the Place upon which the calculous Patient is to be seated, being made hollow, or semilunar, that the two Angles AA may the more commodiously support the Feet. C the Prop for supporting the Patient's Back; which, for the greater Conveniency, is capable of being elevated or depressed more or less, to raise the Patient higher or lower, as the Surgeon may see proper, by means of the iron Rod marked D.

XIII. We have already explained the Manner in which the Operation is to be performed, and Stone extracted by the Surgeon. It therefore now only remains for us to describe the Dressing and Regimen, and to propose a few Cautions. The Patient's Wound being cleansed with a Sponge, and the Ligatures untied, he is first of all to be placed immediately in a Bed, covered with an Oil-cloth, or one that has been waxed: over which may be laid a Linen-sheet folded together immediately under the Patient, to prevent the Bed and Pillow from being spoiled by the Blood and Urine discharged from the Wound, for a few Days after the Operation. The Patient being in this Manner properly disposed, the Wound is to be dressed with some Dossils of scraped Lint. If the Patient be strong, and his Wound bleeds, it may be proper to let it continue so for a while, in order to restrain or prevent an Inflammation, as CELSUS advises. But if there be too large a Profusion of Blood, which seldom happens, it is to be prudently restrained, by applying Pledgits of Lint dipt in the best, or most highly rectified Spirit of Wine, or some other styptic Liquor: or the Wound may be sprinkled with some proper styptic Powder, and the Arteries compressed with the Fingers till the Hæmorrhage ceases, or becomes inconsiderable. The Pledgits of Lint are then to be covered with a Linen Bolster, and a large square Compress, but without any Plaster; securing the whole Dressing by applying the T Bandage, (*Tab. II. Fig. b.*) or that with four Heads, *Fig. d.* If these means prove insufficient, the Bleeding Arteries may be tied up with a crooked Needle and Thread^a. Nor does it seem to be an improper Practice among the *French Surgeons*, who at Intervals anoint the *Scrotum*, *Perinæum*, and Part of the Abdomen, for the first four Days with the *Ol. Rosar.* and then cover the Parts with Linen Rags dipt in *Oxycrate*, before they apply their Bandage: Others only apply *Oxycrate* with large Compresses to the Abdomen. Many Surgeons are for making a strict Bandage upon the Parts at the first dressing though there be no considerable Hæmorrhage: because, say they, the Agglutination of the Wound will by that means be more easy and expeditiously performed. Others, on the contrary, will have the Bandage to be made very slack for the first few Days; that whatever Parts of Gravel, Fragments of the Stone and Blood may remain in the Bladder, might by that means have a free Passage through the Wound. And others, for the same Reason, advise, with the celebrated RAW, to use no Bandage at all; except too great a Profusion of Blood may

Manner of
Dressing af-
ter the Ope-
ration.

^a COLORUS (*Lib. de Lithotomia*, pag. 131.) relates, that he stopt an Hæmorrhage of this kind, that would yield to no other Means, by repeated Phlebotomy, to the Number of three times within the space of Four and Twenty Hours: He also advises Phlebotomy in such Cases to be continued *ad Deliquium Animi*.

make a Bandage necessary for the first few Days. They who are for the strict Bandage after dressing the Wound, fasten the Patient's Legs together at his Knees; lest, by opening his Thighs, the Agglutination of the Wound might be impeded. But they who follow the last Method are in my Judgment most in the right, who apply such a Bandage the second or third Day after the Operation: lest any Gravel, concremented Blood, or Fragments of the Stone, being retained in the Bladder, might prove a Basis for the Formation of more Stones.

Regimen
after the
Dressing.

XIV. After the Dressing, the Patient should be supplied with Plenty of Ptisan, *Decoctum Hordei*, a strengthening Emulsion, and a quieting Draught; not so much to compose him to sleep, as to recover his Strength, and to cleanse or wash out what Relics of the Stone, Gravel, or concremented Blood may remain in his Bladder. His Diet should be ordered the same as usual for People in Fevers, or that have sustained great Wounds: that is, in the Beginning a Ptisan, or *Decoctum Hordei*, made pleasant with some cooling Syrup, for his ordinary Drink. Afterwards, if no Fever comes on, or if it is over, he may be permitted to drink small Ale, or rather Wine well diluted with Water; at the same Time studiously avoiding every thing salt or sharp, spicy, or too much heating the Blood. The Air of the Patient's Bed-chamber should be neither hot nor cold, but as temperate as possible. If the Patient should complain of an unusual Heat and slight Fever, some Blood should be taken from him, a Glister administered, and cooling Medicines taken inwardly. These Difficulties being surmounted, we may judge the Patient to be in a fair Way, and have great Reason to expect a Cure. But if, on the contrary, a cold Chill and Horror seizes the Patient on the third, fourth, or fifth Day, followed by an intense Fever, Nausea, Vomiting, Hiccoughs, and convulsive Motions; or if the Wound does not kindly suppurate, but becomes dry; we may thence be generally pretty certain that Death will follow. At first the Wound may be dressed once or twice in a Day with scraped Lint, and some digestive Unguent, as is usual in other Wounds: over the scraped Lint should be applied, and secured by Bandage, a large Compress dipt in Warm Spirit of Wine, Oxycrate, or some proper Fomentation, to prevent an Inflammation of the Parts. After the third or fourth Day the Surgeon may in my Opinion safely venture to tighten the Bandage, and retain the Parts a little closer together; which should be done gradually one Day after another. When a good Suppuration and Union of the Parts has succeeded, the Wound may be dressed with some vulnerary Balsam; such as the *Bals. Capiv.* and Liniment *Arcei*, made very warm, and applied with scraped Lint instead of the digestive Ointment used before, securing the whole dressing carefully with some sticking Plaster, and Compress on each Side. This way of dressing should be continued twice a Day, till the Lips of the Wound are united: after which a good Cicatrix may be procured, by dressing once in a Day with dry Lint only, applying a Plaster over it. The Agglutination of the Wound may be also much promoted by the Patient's keeping his Thighs close together, and by lying as much as possible on his right Side as is customary. This being observed for some Time, the Patient may then turn himself, and lie on either Side, or on his Back, at Pleasure, provided he lies still, and keeps his Thighs close together: to do which the better and more effectually, it is often necessary, especially in Children, to bind the Thighs close to each other, and

and command them to keep still in the Bed. Nor ought the Patient to be suffered to rise, and walk about before the Urine discharges itself all by the common and natural Passage of the Urethra, and the greatest Part of the Wound is healed up, as before; which is sometimes performed within the space of eight Days in Children, where the Stone has not been large and difficult to extract. Afterwards, walking may be so far from hindering the Urine from discharging itself the right Way, that it may sometimes promote the same, and not indispose the Wound for healing. Nor will it be improper for the Surgeon to compress the Wound with his Hand, about six or seven Days after the Operation, in order to see if the Urine will discharge itself by the natural Passage of the Urethra, if it does not take that Course of its own Accord. As often as the Linen is made wet and foul with the Patient's Urine, it should be changed for clean, if possible, to prevent an Ulceration of the adjacent Parts.

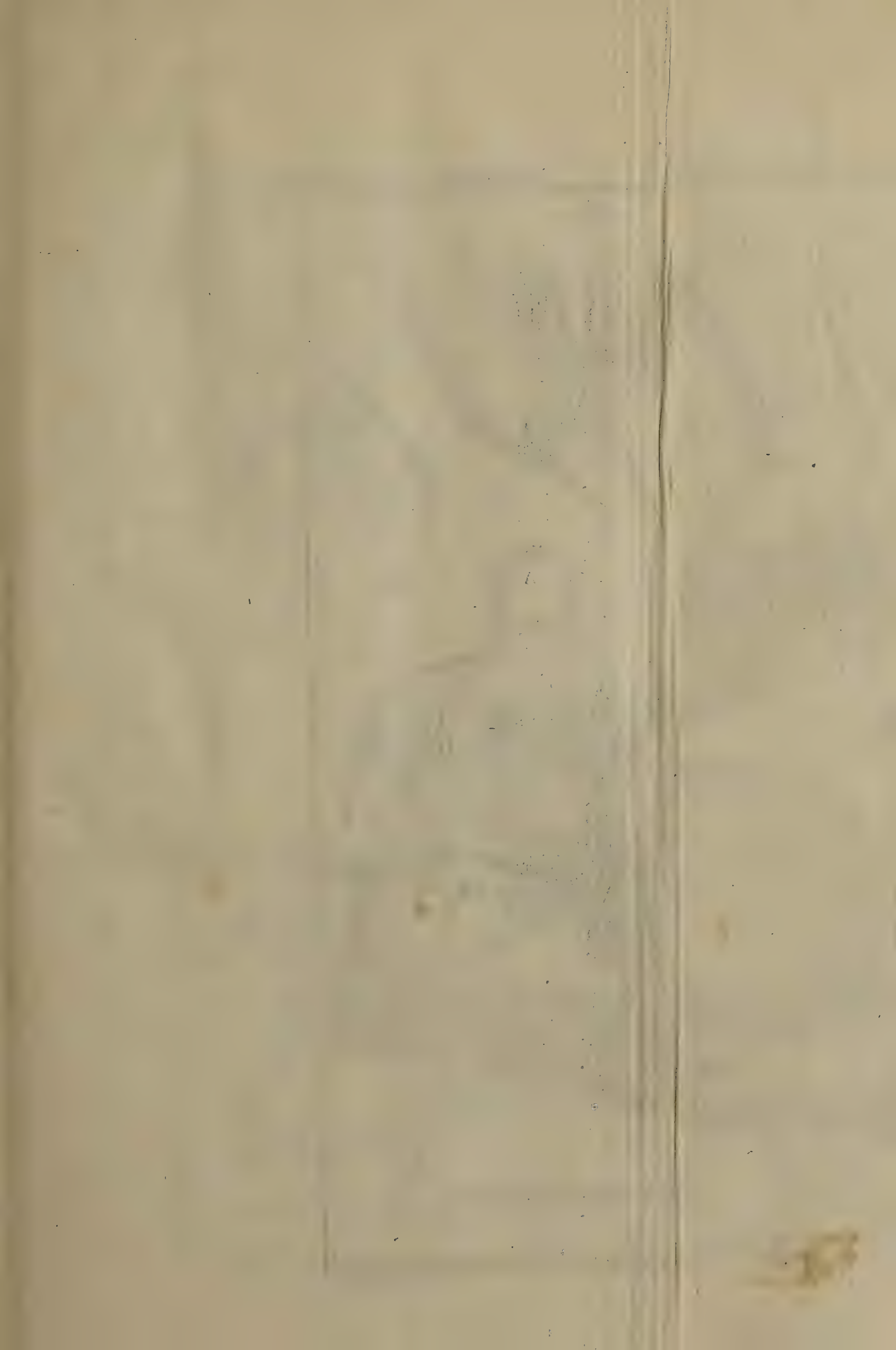
XV. Lastly, I shall conclude upon this Method, by proposing a few Cautions, Cautions for the sake of Beginners, which are very necessary to be known and observed. Sometimes a corrupt, spongy, or fleshy Substance is extracted together with the Stone, which is then a Sign of some Abscess, Caruncle, or fleshy Excrecence formed within the Bladder. If the Catheter cannot be passed into the Bladder of an Adult, who has presumed to undergo the Operation, from whatever Cause it may proceed, whether an Inflammation in the Neck of the Bladder, a Caruncle, violent Phimosis, or a Stone impacted into the Neck of the Bladder: in such a Case the Operation ought either to be performed according to the old Method, by the *Apparatus minor*, cutting upon the Fingers; or else, according to PETER FRANCUS, to make the Incision above the *Ossa Pubis*, as we shall hereafter direct more at large. If a Prolapsion of the *Anus* or *Rectum* should be occasioned from the Strainings caused by the violent Pain of the Stone, in the Beginning of the Operation, (as it often happens) it may be again replaced by the Finger after the Operation is finished, if it be inconsiderable: but if the Prolapsion be great, the Intestine should be immediately replaced, and sustained by an Assistant with a Compress, to prevent its being wounded. But if this Accident should happen in the Middle, or towards the End of the Operation, the replacing of the Intestine may be deferred till the Operation is over; when, upon a Cessation of the Pain, it usually recovers its own proper Situation, which may be otherwise assisted with the Fingers. If the Operation is to be performed upon one who has been cut before, then the Incision is to be made directly in the old Wound, or Cicatrix. Nor should the external Wound be ever made too small, lest the Extraction of the Stone should be thereby rendered difficult, especially as we are assured from Experience, that a large Incision heals as soon, and as kindly, as one that is smaller^a. But when the Stone is impeded in its Extraction by the Opening being too small, the Wound should be enlarged in the most convenient Part of it, either by the Knife or Scissars. But if notwithstanding the Stone proves too large to be extracted, 'tis much better to desist, than to kill the Patient by too violent a

^a The making a large Incision was also approved of by CELSUS, ALEUCASIS, ÆGINETA, and others of the Ancients before the Moderns.

Treatment. If the crooked Forceps are to be introduced into the Bladder, it should be with the End of them pointing upwards; though the straight Forceps will generally suffice. Instead of the common Bistoury (*Tab. XXVII.*) those may be also used to Advantage, which are represented in *Tab. XXXI. Fig. 8.* and 18. The Time in which the Wound heals, after the Operation, is various, being sometimes within the space of fifteen or twenty Days, and sometimes four or five Weeks, according to the Patient's Habit, and other Circumstances. When the Forceps of any kind are introduced into the Bladder, it should be done with the Direction of the Finger, the Conductor, or the Handle of the Scoop which has a Button; lest, by mistaking their Way, they might injure the Bladder, and Parts adjacent. If the Stone appears to be flat or plain, it should be rather taken hold of by the Forceps in its upper and lower Part, than by its Sides. Lastly, if the Patient should be afflicted with violent Pains in his Bladder after the Operation is finished, it will be convenient to inject some warm Milk, or other Decoction through the Wound by a Syringe into the Bladder. But if the Injury may be reasonably supposed to proceed from the Roughness or Largeness of the Stone contusing the Bladder; it may then be proper to fill the Bladder with *Aq. Hordei*, or a Decoction of some vulnerary Herbs, made warm, and mixed with some *Mel Rosar.* or else warm French Wine, in which Myrrh has been boiled, with the Addition of some *Mel Rosar.* For the rest, I would advise the Surgeon not only to consult TOLET, GREENFIELD, ALGHISH, and other Writers, before he undertakes the Operation; but also to call in the Advice of some prudent Physician. For the Conveniency and Advantage of this Method of Lithotomy above the rest, the Reader may peruse LE DRAN's *Parallele des Methodes*, &c. On the contrary, this Method is rejected by GARENGEOT (*in Oper. Chirurg.*) and DENYS (*in Observ. Chirurg.*) as it also was before them by DOUGLAS in his Treatise of the High and Lateral Operation, as also by CHESelden and MORAND, where they treat on this Method. Even LE DRAN himself, who stood up so strongly for the *Apparatus major*, has since changed his Opinion. In his *chirurgical Operations*, published in 1743, he wholly discards the *Apparatus minor*, *major*, and *altus*; and prefers the lateral Method, which he now practises.

AN EXPLANATION of the TWENTY NINTH PLATE.

Fig. 1. Represents the *Urethra* of a Male Subject (freed from the other Parts of the *Penis*) together with the Bladder, prostate Gland, and *Intestinum Rectum*, all viewed on their left Side, and figured as much as possible to the Life, so as to exhibit the natural Disposition of them, as they appeared in a Lad of fourteen Years of Age. A the Glans Penis; BCDEF the *Urethra* in its natural curve Position; E the Bulb of the *Urethra*; F a Part of the *Urethra*, termed membranous; G the Body of the Bladder itself; H its *Fundus* or Bottom; IKL the Neck, or Entrance of the Bladder, invested with the prostate Gland, and denudated in its muscular Fibres, which compose the *Sphincter vesicæ*, to render it more conspicuous. I is the beginning or *Apex* of the Gland; K the Body of it; L its Extremity, or Margin next the Bladder. MN denote the Neck, or lower Part of the Bladder next the *Intestinum Rectum*,





Rectum, in which is formed the left *Sinus*, or Cavity, which often impresses itself into the *Rectum*, so as to conceal or intercept the Stone. N O P denote the back Part of the Bladder, which lies next to the *Os sacrum*, and Cavity of the Abdomen, being covered with the *Peritonæum*. Q R is the anterior Part of the Bladder in our erect Position, but the uppermost when we lie down: 'tis this Part which is divided in the high Operation, being not invested with the internal Lamina of the *Peritonæum*, but quite free and excluded from the internal Cavity of the Abdomen; whereas the Parts of the Bladder marked N O P H Q are immediately invested with the Coat of the *Peritonæum*, and lie next the Cavity of the Abdomen, as may be plainly perceived by inflating or injecting some Liquor into the Bladder of a dead Subject. But, concerning this, we shall be more particular in our Explanation of the succeeding Table. S S denote the *Intestinum Rectum* connected to the Bladder; T the *Sphincter Ani*, or Muscle destined to close the Mouth of the *Rectum*. V is Part of the left feminal Vesicle; X X the Interstice betwixt the *Intestinum Rectum*, Bulb of the Urethra, and Neck of the Bladder, filled partly with the *Membrana adiposa*, and in Part composed of muscular Fibres detached from the *Sphincter* and elevating Muscles of the *Anus*.

Fig. 2. Represents the Position of the Bladder and *Urethra* in Women, as they are seen on the left Side, together with their Connection to the *Uterus* and *Vagina*, taken from ALGHISH. A denotes the Bladder; B B its *Sphincter* Muscle, including the *Urethra* marked C C. D the external Mouth or Entrance of the *Urethra* at the *Vagina*; E the *Clitoris* and its *præputium*; F F the *Nymphæ*; G G the *Labia pudendi*. H represents the *Os Uteri externum*, or Entrance of the *Vagina*; I I the Body of the *Vagina*; K the *Uterus* itself. L shews the *Os Tinæ*, or internal Mouth of the *Uterus* seen through a lateral Slit made in the *Vagina*.

Fig. 3. Shews the Manner in which the Catheter is to be introduced into the Urethra, and afterwards passed into the Bladder. A denotes the Surgeon's left Hand elevating the Penis; B his right Hand thrusting the Catheter into the Urethra, in such a Manner that the convex Part of the Catheter looks towards the Back of the Penis, and the Abdomen.

Fig. 4. Denotes the Position into which the Catheter is to be turned in the Urethra, when it has reached the Bulb of the Urethra marked E in Fig. 1. it is to be then inverted, so that A the concave Part of the Instrument may be next the Abdomen, and the Extremity of it, marked B, gradually insinuated thro' the Neck of the Bladder into its Cavity. C denotes the Handle of the Catheter by which it is to be guided in passing it.

Fig. 5. Exhibits the ancient Method of Lithotomy described by CELSUS, performed by introducing the two fore Fingers into the *Anus*: whereby the Stone and Neck of the Bladder are thrust outward in the *Perinæum*; and the Incision B B is then made upon the Stone in the most prominent Part of the *Perinæum* marked A. The Figure is taken from TOLET's Treatise on Lithotomy: but the Place and Figure of the Incision is added by myself.

Fig. 6. Shews the Method of extracting the Stone marked A, by the Hook B, when it sticks in the Wound, so as not to be extricable by the Forceps or Fingers; taken also from TOLET.

Fig. 7. Is a Brass Instrument of MARIANUS, adapted to extract Stones out of the Urethra. A denotes that Part of the Instrument which is to be insinuated into the *Urethra* behind the Calculus; B the round Ring or Handle by which the Instrument and Calculus are to be then drawn out of the *Urethra*.

Fig. 8. Represents an anterior View of the Bladder taken out of a Lad. AA denote the Neck of the Bladder, and Beginning of the Urethra. BB the Body of the Bladder, C its *Fundus* with the adjacent Part of the *Urachus*; DD the prostate Gland investing the Urethra; EE the seminal Vesicles, in Part visible on each Side, which in Adults are more protuberant, and extended up to FF; where being hollow internally, there is a Sort of *Sinus* formed in the Bladder on each Side, in which the Stone often lies concealed: they may be therefore not improperly called the *Sinus's* of the Bladder, which are yet wanting in the Bladders of Infants and Children. The Figure of the Bladder in Adults is therefore somewhat different from that in Children. The Bladder indeed resembles the Form of a Pear in both of them; but with this Difference, that in Children the Apex of the Pear is downwards toward the Urethra, as in this Figure; but in Adults the Apex of the Pear is upwards, the Bladder being broadest downward in them, as may be seen in *Fig. 1.* of this Plate, and in *Fig. 1.* and 2. of *Tab. XXXII.*

Fig. 9. Represents the Manner in which the adult Patient should be placed and held for Lithotomy, according to ALGHISH; which is in Part different from the Method of TOLET, and other modern Operators. A denotes the Posture of the Patient; and B the Surgeon, as he holds the Catheter in his left Hand, and the Incision Knife in his Right. CC two of the Assistants, who are placed on each Side of the Table, to secure the Patient's Limbs, holding the Foot in one Hand, and the Knee in the other; D the Assistant who kneels upon the Table, and by striding over the Patient, keeps his Body from rising or moving, while with his Hands he draws up the Scrotum, and extends the Skin of the Perinæum. EE a Cushion placed under the Patient; F a Vessel placed beneath the Patient to receive the Blood, and perhaps the Fæces, discharged in the Operation; G denotes the Part of the Perinæum in which the Incision is to be made. H the Case or Pouch for containing the Instruments, to be fastened about the Waist of the Operator; this is represented by itself in *Tab. XXX. Fig. 6.*

Fig. 10. Exhibits one of the open Ligatures with which RAW used to fasten the Patient's Hands and Legs together. A the Loop for containing the Wrist; BB its two loose Ends to be fastened round the Leg: of which see more hereafter.

C H A P. CXLII.

Of Lithotomy by the Apparatus Altus, or the high Operation of PETER FRANCUS, whereby the Stone is extracted by an Incision in the Hypogastric Region, above the Offa Pubis.

I. **B**ESIDES the two preceding Methods of Lithotomy by the *Apparatus Major* and *Minor*, practised by our modern Surgeons, we also meet with a third Method proposed and described in their Chirurgical Writings; which is ascribed to one PETER FRANCUS, a French Surgeon, as its first Inventor. After him it has been denominated *Methodus Franconica*. From the Place of Incision being in the Middle of the *Hypogastrium*, it has been also termed the *Hypogastric Section*; and commonly the *Apparatus Altus*, because the Operation is performed above the *Offa Pubis* in the superior and anterior Part of the Bladder: whereas in the *Apparatus Major*, *Minor*, and the Lateral Operation the Incision is made beneath the *Scrotum* in the *Perinæum*. However, this new Method of Lithotomy was hardly ever once performed by its Inventor, but it was as quickly expunged the Practice of Surgery, and hardly ever mentioned in the Schools, but with a View to explode it. For, notwithstanding its first Author performed the Operation with Success upon a Lad of two Years old, at *Lausanne* in *Switzerland*, Ann. 1560, it was because he was obliged to it from the Stone being as big as a Hen's Egg, too large to be extracted at the *Perinæum*^a. And though he undertook the Operation by the Intreaty of the Parents, and happened to succeed therein, he thinks the Success ought to be attributed rather to Accident than Art: he is also so far from recommending this Method of Lithotomy, either to the Patient or Surgeon, that he pronounces it to be extremely dangerous to the Patient, and a rash Undertaking in the Surgeon. And this was insisted upon the more at that Time of Day, because a Wound in the upper or membranous Part of the Bladder had been always judged by the Ancients, after HIPPOCRATES^b, to be mortal. But from that Time there have been several of the more prudent Physicians and Surgeons^c, who were led to think, from the anatomical Structure of the Parts, joined with Examples of Success in Practice, that the Method of cutting for the Stone above the *Offa Pubis*, might be both safe, easy, and expeditious to one acquainted with the true Situation of the Bladder without-side the *Peritonæum*, together with its Conformation and Connexion to the adjacent Parts, as also with the Method of cutting into the

The Origin
and History
of this Me-
thod.

^a See his Book entitled, *Traité des Hernies*, Cap. 33. p. m. 139, 140.

^b Aphor. 18. Sect. VI. and CELSUS Lib. VII. Cap. 26.

^c As ROSSETUS de partu Cæsar. Cap. VII. HILDANUS, Lib. de Lithot. in Operib. p. m. 732: & seq. NIC. PIETREUS in Quæst. Med. An extrahendum calculum dissecanda ad pubem Vesicæ Edit. Paris. 1635. TOLET, Treatise of Lithotomy, Chap. 13. SOLINGEN, Operat. Chirurg. PROBY in Philos. Transact. Ann. 1700. & Act. Erud. Lips. An. 1701. pag. 230. DIONIS Chirurgical. Operat. Demonstrat. III. on Lithotomy. GREENFIELD on the Stone and Gravel, Lond. 1710. pag. 152. GARENGEOT Chirurg. Operat. Edit. I. Tom. I. pag. 358. PATIN apud Barth. Cent. IV. Epist. 20, 21. An. 1660.

Bladder without injuring its Fundus. That it was possible for the high Operation to be performed with Success, might appear from the Instance of its accidental Author, PETER FRANCUS, who first led the Way to it, as we before observed, without any bad Event. TOLET also informs us (*Chap. 13.*) that BONNETUS, a celebrated Surgeon and Lithotomist formerly at *Paris*, used to perform the high Operation there to good Purpose. The Method of performing Lithotomy by the *Apparatus Altus* described by TOLET, almost in the Manner it is proposed by FRANCUS, take as follows.

By whom
practised or
approved.

II. First, some Assistant is to introduce his two fore Fingers into the Patient's Anus, to protrude the Stone forwards, and towards the upper Part of the Bladder, and to hold it there: in the mean Time the Lithotomist makes an Incision successively through the Skin, Fat, Muscles, and Bladder itself, near the *Linea Alba*, a little above the *Ossa Pubis*. Having found the Stone, after dilating the Wound with a proper Instrument or Dilator, he then extracts it by the Forceps; and afterwards endeavours to heal the Wound by treating it with vulnerary Balsams, according to the general Practice of treating Wounds of the Abdomen. But as for filling the Bladder first with Water, or some other proper Liquor, TOLET takes no Notice thereof, notwithstanding it had been long before proposed by ROSSETUS. To FRANCUS and BONNETUS we ought to add GREENFIELD as a Practitioner of the *Apparatus Altus*; for in his Treatise on the Stone (*Pag. 152.*) he relates that he was obliged to extract a Stone in this Method, by making an Incision above the *Ossa Pubis*, which happily succeeded: but what was the Reason that obliged him to this Practice, he does not inform us, though it might be probably because the Stone could not be extracted at the *Perrineum*. And though HILDANUS first of all dissuades from this Method of cutting in general, yet he afterwards writes^a, if the Stone should be of an exceeding great Size, &c. I should then rather prefer the Method of PETER FRANCUS before the *Apparatus Major*: for if the Stone, by Reason of its Largeness, be pressed towards the *Inguen*, (he would, or ought to say, the *Pubis*) I am persuaded that it may be extracted with less Pain and Danger at the *Pubis*, than to force it through the Neck of the Bladder. But if a large Stone may this Way be more commodiously extracted, than by the *Apparatus Major*, as HILDANUS thinks and acknowledges, certainly a small Stone may be extracted by Skill with much more Ease, and less Pain and Danger. The high Operation is also much recommended by PIETREUS: and the great *French* Anatomist RIOLAN (*in Anthropograph. Cap. 28.*) evidently proves the Operation to be practicable from the Situation and Structure of the Bladder, and tells us of its being performed within his Knowledge. Also DIONIS, one of the most eminent modern Chirurgical Writers in *France*, does, for the same Reasons, think, that this Method may be not only practised with Success; but when the Bladder has been previously filled with some warm Liquor, he thinks it preferable both to the *Apparatus Major* and *Minor*, if it were but brought more into Use: and he asserts that M. FAGON, at that Time first Physician to the King of *France*, was also of the same Opinion. Whence it appears, that many of the *French* have frequently wrote and con-

^a Lib. de Lithotomia in Oper. Chirurg. p. m. 732, 733. But he there wrongly calls it *Sectio Inguinalis*; because the Incision is not made in the *Inguen*, but in the *Hypogastrium*, above the *Ossa Pubis*, whence it is also termed *Sectio Hypogastrica*.

tended for this Method of Lithotomy. We have also a remarkable Example of a Stone extracted with Success from a Maid by the high Operation, described in the *Philos. Transact.* of the Royal Society *Ann.* 1700. *pag.* 455, by one Mr. PROBY, a Surgeon: which I shall consider more particularly when I come to treat of the Methods for extracting the Stone from Women. But this I am a little surprized at, that not one of the many *English* Lithotomists who have wrote on this Method, should so much as mention this Instance; which one would be therefore apt to think was unknown to them, notwithstanding it was made public in the aforesaid *Transactions*, and in the two *German* Editions of my *Surgery*, *Ann.* 1724. Nor have any of the *French* Writers on this Subject taken any Notice of this remarkable Instance, except M. FALCONET^a, a Physician of *Paris*. The Case being thus, it seems to me not a little extraordinary, that so many eminent Surgeons and Lithotomists of the *French*, should absolutely reject and treat this new and more simple Method with Neglect, when it had been several Times performed with Success^b: nay, it even appears on many Accounts to be much more easy, simple and obnoxious to fewer Inconveniences than the other Methods. The high Operation is not attended with the Dangers of wounding the Parts subservient to Generation, or for discharging the Urine, as the Urethra, Sphincter of the Bladder, Ureter, nor Intestinum Rectum. Nor are any of the larger Blood-vessels in Danger of being this Way wounded: nor is this Method afterwards attended with a *Fistula in Perinæo*, an Incontinency of the Urine, or Impotency and Weakness from too great an Hæmorrhage. Which Advantages, with other Conveniences, are exhibited at large by ROSSETUS, in his Treatise *de Partu Cæsareo*; where he greatly recommends the high Operation, and demonstrates that the Incision made this Way into the Bladder, if it did not communicate with the Cavity of the Abdomen, so as to transmit the Urine into the same, is by no means mortal.

III. In Consideration of the fore-mentioned Advantage, joined with many weighty Reasons, this Method of extracting the Stone, according to PETER FRANCUS, above the *Osса Pubis*, was industriously revived by the learned Physician, Dr. JAMES DOUGLAS, after it had been almost buried in Oblivion: for he partly by reasoning from the Situation, Structure, and Connection of the Bladder, and partly from the Authorities of others who had wrote on the Subject, demonstrated, before the Royal Society, *Anno* 1718, that the Stone may be safely extracted by cutting into the upper and anterior Part of the Body of the Bladder, when the Incision is skilfully performed. Accordingly in the Year following, 1719, his Brother, JOHN DOUGLAS the Surgeon, performed the Operation on a Man afflicted with the Stone; after which he published in the Year following, 1720, a Treatise on the Subject, intituled *Lithotomia Douglassiana*. In this Treatise he not only confirms the Reasonableness of the Method by Arguments taken chiefly from Anatomy, but also relates the several

Revived by
DOUGLAS.

^a In *Quæstione Medico-Chirurgica*, An educendo calculo, ceteris antefendus sit apparatus Lateralis? Edità Parisiis *Ann.* 1730. *pag.* 6.

^b GARENGEOT relates, in his Chapter of high Operation, that one of the best *Paris* Lithotomists, M. THIBAUT, would never perform this Method on a living Subject, though he was acquainted with the Advantage of it. But the Question might be also put to himself, why he never performed the same?

Advantages of this new Method of Lithotomy, beyond those commonly practised: and, what is more, confirms the whole by a remarkable Instance of his performing the Operation successfully upon a Lad of sixteen Years of Age; with this Method of Cutting for and extracting the Stone^a. Soon after this, the high Operation was frequently practised with Success, by DOUGLAS, CHESELDEN, and other Surgeons of the *English*, as I had Intelligence from some of my Friends then dwelling at *London*, and was soon after informed by the Treatises published on the Subject. The chief of which were Mr. W. CHESELDEN's *Treatise on the high Operation for the Stone*, Lond. 1703, 8vo. *Cystotomia Hypogastrica*, Anonymus, Lond. 1727. 4to. *An Essay on Lithotomy* by Dr. Middleton, 4to. Lond. 1727. *Traité de la Taille au haut Appareil*, de M. MORAND, Paris 1728. and DOUGLAS's *Dissertation on the High Operation*, Lond. 1729. In which he reckons up sixty several Patients that had been cut in this Method by different Hands, the greatest Part of them surviving.

When, and
with what
Success I
myself per-
formed this
Operation.

IV. For my own Part, as this new Method of Lithotomy appeared to be supported by anatomical Reasons, professed with sufficient Weight and Evidence by ROSSETUS, DIONIS, and DOUGLAS; and finding it answer to Experiments often made by myself on dead Subjects, and by DOUGLAS, CHESELDEN, and other *English* Surgeons, upon living Subjects; this prevailed with me in a Case of Necessity to follow the Example of FRANCUS and GREENFIELD in the Year 1723, April 17. at which Time I performed the High Operation without any Fear, upon a Man upwards of thirty Years of Age, at *Helmstadt*. For, in this Case, I could not extract a large Piece of the Stone by the Wound in *Perineo*, according to the Method of RAW, (which was sometimes used by me, perhaps before any body besides its Author;) as the Fragment of the Stone could not be laid hold of, and consequently not extracted by the Forceps, because it lay concealed in some Sinus or Cavity in the Bladder, such as are sometimes observed by Lithotomists. See *Tab. XXXII. Fig. 1. and 2.* This I did in the Presence of many Surgeons and Students in Physic, the Day after I had performed the other Method of Lithotomy without Success. Nor did I in this Case make any previous Distension of the Bladder by injecting some Liquor; for that was prevented by the Wound already made in *Perineo*: but making an Incision into the Body of the Bladder at the *Ductus Rosseti & Douglassii* above the *Offa Pubis*, I then enlarged it both upward and downward by the crooked Scalpel armed with a Button at the Point (*Tab. V. Fig. 5.*) and introducing my Fingers, I extracted the Stone with great Ease and Expedition^b. The miserable Patient thus willingly endured the Operation, being rather desirous to suffer Death, than to be perpetually tortured with the excruciating Pains

^a The Celebrated Physician Dr. MARTIN LISTER affirms, in his Journey to *Paris*, published at *London* in 1699. p. m. 238. that he formerly made Proposals to the Royal Society for establishing this Method of Lithotomy; but as he does not refer to the particular Part of the Transactions, I could never find the Passage: however, should the Method be at any Time restored to Practice, it must certainly reflect an Honour to his Name.

^b ROSSETUS, DOUGLAS, CHESELDEN, MIDDLETON, MORAND, LE DRAN, GARENGEOT, and others, direct the Bladder to be filled with some Liquor previous to the High Operation; but FRANCUS, GREENFIELD, ROSSET, BERRIER, and this Instance of my own, demonstrate, that the Operation may be successfully performed without that Preparation.

of the Stone for the future. The Patient continued very well for the first three or four Days after the Operation. But about the fifth or sixth Day he was taken with a cold Fit, followed by a feverish Heat; which being mitigated by the Use of proper Medicines, he was yet strangely afflicted with Pains in his Back and Loins, attended with Sicknefs at his Stomach and Faintnefs, which he had been also troubled with oftentimes before the Operation was performed. The Wound, both externally and internally, was not attended with any Pain: yet the Lips could not at all be brought to suppurate and unite^a, notwithstanding I applied very good sticking Plasters, and the broad uniting Bandage, (*Tab. V. Fig. 8.*) to keep them together, as is usual in other Wounds of the Abdomen. I also dressed with a very good vulnerary Balsam, with long and thick Compresses applied on each Side of the Wound, which however did not prevent the Urine from escaping thereby out of the Bladder: tho', at the same Time, little or no Urine passed through the Wound in *Perinæo*, and none at all thro' the natural Passage of the Urethra. In about four Weeks Time, the Patient being exhausted by great Weakness, Reachings, &c, died^b. Upon opening his Body, the Wound of his Bladder made in *Perinæo* appeared to divide Part of its Neck and Body: and the Wound made above for the high Operation, appeared right in all respects, without any Opening into the Abdomen, or Division of the Peritonæum; nor was there any Blood or Urine found in the least within the Cavity of the Abdomen. But the Kidneys were found greatly ulcerated, and wonderfully distended with a purulent Matter; which was the true Cause of the intense Pain in his Back and Loins, with the other Symptoms, and was apparently the Cause of his Death.

V. But, to speak my Mind freely, this first Specimen of my performing the high Operation, tho' it was done dextrously, and according to Art; yet it did not seem to turn out so advantageously as one would have imagined from the Representations of ROSSETUS and DOUGLAS, especially with regard to the healing of the Wound: which, in my Opinion, will but difficultly succeed in this new Method, and that for several good Reasons. For as Anatomy demonstrates, that the lower Part or Neck of the Bladder, is armed with a strong Sphincter Muscle for its Contraction; and as the Urine does not naturally flow out of the Bladder and Urethra by its own Weight, without the Assistance of the contractive Force of the muscular Coat, termed *detrusor*; we need not at all

The first
Difficulty
attending
this Me-
thod.

^a It is also an Observation made by DOUGLAS, and the other *English* Surgeons, that when the Wound could not be suppurated and cleansed, it was impossible to recover the Patient.

^b M. WINSLOW writes in a Letter upon the High Operation to M. MORAND, dated *Paris* 1728, that the *Apparatus Altus* was first restored in *England* by DOUGLAS, but in *France* by M. MORAND, who first performed the Operation at *Paris* in 1727. But as I performed this Operation before M. MORAND in 1723, I might possibly be the first both among the *French* and *Germans*, who undertook and described the High Operation; for I had given a full Account of the whole in the second *German* Edition of my *Surgery* in the Year 1724; as I also had to WINSLOW himself, in a Letter dated *May* 14, 1723, from *Helmstadt*: which makes me wonder, that none of the *French* or *English*, who have since wrote on the Operation, should not take any Notice thereof, except Mr. JOHN DOUGLAS, in his Treatise on the *High Operation*, pag. 126 and 128, published *Anno* 1729, when at the same Time my *Surgery* was well known in most Parts of *Holland* and *Germany*, and had a Character given of it by SERMESIUS, a Physician at *Amsterdam*, in his *Dutch* Translation of DOUGLAS's *Lithotomy*.

wonder that the Bladder, irritated by its urinous Contents, should contract and expel that Excrement with more Ease thro' the divided Part of the Bladder above, which has no Muscle for its Contraction, than thro' the natural Passage of the Neck of the Bladder, which is always contracted by a strong Sphincter: so that from this continual Protrusion of the Urine thro' the Wound, its Agglutination must be greatly impeded. To this we may add, that the external Wound in the Abdomen is also no less difficult to heal or unite: because the divided Lips are constantly drawn from each other, by the Contraction of the oblique and transverse abdominal Muscles, whereby they constantly recede from the *Linea Alba* towards the *Ossa Ilei*.

A second
Difficulty.

VI. Nor is the Agglutination of the Wound rendered difficult from the continual Distraction of its Lips barely; but also from the Dressings, and topical Application of the Medicines, being immediately spoiled, or rendered inefficacious, by the constant Efflux of the Urine. For tho' I took all possible Care of the Patient, which I cut by this Method, to renew the Dressings, and approximate the Lips of the Wound two or three Times every Day; treating the same with an exceeding good vulnerary Balsam, and long sticking Plasters almost sufficient to cover the whole Abdomen, brought very close to each other, together with long and thick Compresses applied on each Side of the Wound, and secured by means of a very long and strong uniting Bandage, yet all proved to no Purpose: for the Plasters, Compresses, and Bandage were all wetted and loosened by the Urine in a very short Time after their Application, so that it was often necessary to repeat the Dressings many Times in a Day; but in the mean Time the Agglutination of the Wound did not in the least succeed. But lest any body should think that we neglected any thing that might be useful or necessary towards the Agglutination of the Wound, it may be here proper to observe, that no-body has yet proposed a better Course than that which was followed by us. For even DOUGLAS and GREENFIELD do not so much as mention a Word about the Means of healing the Wound throughout their whole Treatises; but only tell us in general, that they cured their Patient in the space of four Weeks.

Healing of
the Wound
often ex-
tremely dif-
ficult.

VII. From what has been now said, I think it plainly appears how much those are mistaken, who prefer this Method of Lithotomy beyond the rest, on account that the Wound this Way made, is more easily and expeditiously to be healed. For, say they, the Urine will, from the Laws of Fluids, much more easily pass thro' the Aperture in the lower Part of the Bladder than that above; and therefore the Fistula, which is so frequently caused by the constant Flux of Urine through the Wound in *Perinaeo*, will not be so likely to happen in the Wound made by the high Operation. But any judicious Person may perceive, that there is nothing at all in this, if he considers what we have but now said of it. For as the Urine is expelled out of the Bladder, not by its own Weight, but by the proper Contraction of that membranous Receptacle, assisted with the Pressure of the Diaphragm and abdominal Muscles; it must necessarily follow, that it will more easily discharge itself by that Pressure thro' a Wound in the upper Part of the Bladder, where there is less Resistance, than thro' the Neck of the Bladder, which is contracted with a strong Sphincter Muscle. And this seems in my Opinion to be the Reason, why so many Surgeons have neglected this

this new Method of Lithotomy; that though it has, in some Hands, several Times succeeded well, yet it is now laid aside by almost universal Consent. But the Reason why all the Surgeons, who have described the high Operation, have taken little or no Notice of the great Difficulty there is in healing the Wound, and say nothing of their Method of treating, may proceed from a Jealousy of their Reputation; thinking it better to say nothing of the Matter, than to give the World an Opportunity of attributing their want of Success to a want of Skill. For there are but very few Physicians, who, after the Manner of HIPPOCRATES, or of myself, are free and open in declaring the Cases in which they miscarried, as well as those in which they succeeded, in order to serve their Posterity, in leaving them prudent Cautions. The Generality indeed plead, with some Reason, that the imprudent and envious may from thence find Matter for Calumny and Disgrace, by attributing the Death of a Patient to a wrong Treatment, when his Disorder was in itself incurable. TOLET tells us, from the Relation of others, that BONNETUS performed the high Operation for the Stone on several Patients: but with what Success, or with what Artifices the remaining Wound was afterwards healed, neither TOLET nor BONNETUS say a Word. But this we are assured of, that BONNETUS, and the major Part of the *French* Surgeons, have ever since neglected this Method, and cut their Patients in the common Method by the *Apparatus Major*; which they continue to this Day, as we learn both from History and Report. We may therefore reasonably pronounce, that the high Operation was very seldom performed by BONNETUS, and perhaps never but when he could not treat the Patient, or extract the Stone by the common Apparatus^a. I might seem detractory to the Character of an eminent Surgeon to confess, that a Wound, which had appeared before to be slight in the Judgment of others, could yet be not at all, or but very difficultly cured by him. But we may reasonably conjecture, that neither BONNETUS, nor any other of the most celebrated *French* Surgeons, had any Reason to reject this new Method of Lithotomy, besides that of the ill Condition of the Wound, indisposing it to heal; since they allowed it to have the several Advantages (mentioned § I.) over the other Methods. Some will perhaps reply, that DOUGLAS happily cured the Wound after he had performed the high Operation on a stout young Man, who had no large Stone: but we are not from hence to conclude universally, in different Habits and Circumstances. For there is the same Necessity for performing this Operation on Patients advanced in Years, and of an ill Habit of Body, in which the Wound will not at all be disposed to heal. I must therefore declare my Opinion, that I think it the Part of a prudent Surgeon, not to engage in the high Operation as the best Method of Lithotomy, 'till more speedy and effectual Means shall have been discovered for consolidating the Wound, and approved or confirmed by repeated Instances of Success. As far M. TOLET's Opinion, that the Wound made in the high

^a And that difficult Cases of this Kind may sometimes happen, in which the most expert Surgeon cannot extract the Stone through the Wound in *Perinaeo*, is apparent, not only from the Examples of FRANCUS and GREENFIELD, but also by the Acknowledgment of many of our most celebrated modern Surgeons, V. RUYSCHII *Obf.* 89. *Vita Clar.* BORRICHII in *Collect. Script. Chem. Illustr.* SERMESIUS in *Lib. de Lithotomia*. DOUGLAS in his Preface, DENYS *Observ. Chirurg.* p. 69, 71, 90, 92. and COLOT *Lib. de Lithotomia in Præf.* p. 43.

Operation might be as easily cured as other Wounds of the Abdomen, that seems to be a sufficient Proof of his being unexperienced in this Affair, speaking merely by Conjecture. Lastly, whether *Gastrophia* may be practised with Success in this Operation, as it is recommended by ROSSETUS and SOLINGEN, I am yet doubtful; since the Puncturation of the Bladder in that Operation easily excites bad Symptoms, and as several prudent Surgeons have made Trial thereof to no good Purpose.

Especially
hazardous in
bad Habits
of Body.

VIII. Hitherto I have been giving you my Opinion of the high Operation, which I entertained of it in the Year 1724, when I published the second Edition of my Chirurgical Institutions in the *German* Language. It therefore now remains for me to give a further Explanation of the Opinion, which I at present entertain concerning it. After having considered the several necessary Circumstances, with regard to the Nature and Performance of the Operation, delivered by DOUGLAS, CHESELDEN, THORNHIL, SMITH, PYE, MACGILL, MORAND, myself, and others; I readily concluded, from the many Instances of Patients happily cured by them, that the great Difficulty of healing the Wound, proceeded not so much from the Operation, or the Seat of the Wound itself, as from a depraved Habit in the Patient, who is at the same Time affected with other Disorders. For otherwise the Wound appears to be not so difficult to heal in young Subjects, especially Children, provided a proper Bandage be made use of, and the Wound treated first with some digestive Ointment, and then with a proper vulnerary Balsam, such as *Linimentum Arcei*, *Bals. Capiv.* &c. restraining the Patient in the mean Time to a proper Regimen and Diet. And this I can now affirm the more boldly, as there are at this Day a great many Patients happily surviving the Operation performed by DOUGLAS, CHESELDEN, myself, and others; and a more particular Account of some of the last Patients I treated, recovered by this Method, may be seen in a Dissertation which I published on the high Operation in the Year 1728. So that upon the whole, we cannot but think the Performance of this Method of Lithotomy upon Boys and young Men, who are otherwise of a good Habit of Body, must be attended with Success; as none such have died under my Hands, or those of the fore-mentioned eminent Surgeons. We must therefore recommend cutting for the Stone by the *Apparatus Altus* to be in many Cases a laudable Practice^a; as particularly when the Stone is lodged so high in the Bladder, or is so rough, large, and sharp-pointed, that its Extraction by the Wound in *Perinæo* is thereby rendered impracticable. However, I should rather prefer the *Apparatus Minor*, as more certain and safe in young Children and Infants, who are apt to cry violently, which renders it hardly possible to fill their Bladder with some proper Liquor: an Instance of which is described by MORAND, in his Treatise on the High Operation, pag. 249 and 250.

^a The same is also said of this Method by LE DRAN in pag. 105. of his Treatise inscribed *Parallele*, &c. as also by GARENGEOT, who says (*in Chirurg.* tom. II. pag. 274) it is in many Cases (*une Operation excellente*) an excellent Practice, provided the Surgeon carefully observes the Limits of the Peritonæum, with regard to the Bladder. Of this the Reader may be well satisfied, by perusing the many Instances alledged by DOUGLAS, in his Treatise on the High Operation, especially in the Appendix, pag. 85 and 91.

IX. I am sensible, that the Examples are not wanting of Patients, who have died sooner or later in the Course of this Operation: but then there are also more than a few, who are taken off before a Cure can be wrought by the several other Methods of Lithotomy. And that the Death of the generality, who have died after the Performance of the high Operation, has been owing rather to great Weakness, or a depraved Habit of Body, may appear from many Instances; among which many have been destroyed by Ulcers in the Kidneys or Bladder, as upon opening their dead Bodies has been evidently demonstrated. But when the Patient is advanced in Years, or upwards of thirty, as they generally have been long afflicted with the Stone, and perhaps have an Ulcer in their Kidneys or Bladder, attended with other Disorders and great Weakness; in such I have observed, that the high Operation seldom succeeds well, both in my own Patients, and those whose Cases have been described by DOUGLAS and MORAND: where it is remarked, that some Patients have perished from the preceding Disorders, or others from an Abscess formed in the cellular Membrane covering the Bladder, and others, again, from a Cancer in the Bladder itself. And therefore I never perform the high Operation upon full-grown Men, and those advanced in Years, except there be some urgent Necessity; and particularly when the Stone cannot be extracted thro' the Perinæum. Care should be therefore taken, not unjustly to attribute the Patient's Death to this Operation, when there is no real Cause. But the better to vindicate this innocent Method from such false Aspersions, the Surgeon should never perform the high Operation on such Patients as are already wore out with Weakness, or oppressed with other Diseases, or are even passed their thirtieth Year. But for Boys and young Men, there has not one as yet miscarried under my Care by this Operation, and very few have been lost, even in the Hands of others, as may appear from the Writings of DOUGLAS, &c. on the Subject; but only such as have been advanced in Years, passed their thirtieth, and have been reduced by other Diseases. Lastly, we ought to take Notice, as DOUGLAS has rightly observed, that it is a bad Presage, and usually a most certain Forerunner of Death, when the Wound can be neither duly suppurated nor cleansed: but in those, in whom a Suppuration happily succeeds, being such as are young, and of healthy Constitution, there is hardly the least room to doubt of a certain Cure.

Care should be taken not to falsly attribute the Patient's Death to the Operation.

X. We have already given you our Judgment concerning the high Operation for the Stone. We shall now proceed to explain more accurately the Method of performing the same, chiefly as it has been executed in my own Practice. But before we proceed to this, it will be previously necessary, for the sake of Beginners, to describe the Disposition, Situation, Connexion and Structure of the Bladder; the Knowledge of which is highly necessary for the safe Performance of Lithotomy, and particularly by this Method. And first therefore, upon opening the dead Body of a male Subject, the Bladder being empty, generally appears so small and collapsed, that it lies out of View, concealed under the *Ossa Pubis* and Intestines, insomuch that hardly any Part of it can be seen: but upon inflating or injecting it with Water, it becomes gradually extended, till at last it is considerably expanded above the *Ossa Pubis* towards the Navel, so that its largest and most superior Part, termed its Body and *Fundus*, may be plainly viewed. That this Matter might be the more apparent to Be-

Structure, and Situation of the Bladder with respect to this Method.

ginners,

ginners, I have, in *Tab. XXX.* exhibited several Figures, taken chiefly from the celebrated M. CHESELDEN's *English Dissertation* on the high Operation, *Anno 1723.* And here, *Fig. 1.* represents a dead Subject in an oblique Posture, being a little inclined to the right, to shew the Abdomen chiefly; in which the common Integuments and abdominal Muscles being laid aside, we have a view of the Peritonæum, including the Intestines, and of a large Part of the Bladder marked A, which shews its Body and *Fundus* filled with ten Ounces of Water^a. B is the *Urachus* by which the Bladder is connected to the Navel; CC the two umbilical Arteries; DD the *Offa Pubis* covered with the Integuments turned back, to shew that Part of the distended Bladder, which rises up into the Abdomen above the *Offa Pubis*. *Fig. 2.* demonstrates the Abdomen entirely open, by removing or cutting off the Peritonæum, by which means the Bladder appears to View, distended with twenty Ounces of Water: but here the internal Lamina of the Peritonæum marked AAAA, is left adhering to the Bladder; while its interior Lamina, or cellular Substance, which lies next to the Muscles of the Abdomen, is removed. The letters BB denote that Part of the Bladder, which lies next the pyramidal and *recti* Muscles of the Abdomen, the external or cellular Lamina of the Peritonæum being removed, in order to shew the muscular Fibres. CCCCC denote the Bounds or Margin of the internal Lamina of the Peritonæum, investing chiefly the *Fundus* of the Bladder, which lies under and touches the Intestines, and is the Part of the Peritonæum, by which the Bladder is excluded from the Cavity of the Abdomen^b. DD the *Offa Pubis*; EE the Intestines. BB denote the Part in the middle of the Body of the Bladder, which is divided in the high Operation. *Fig. 3.* represents only the right half of the Abdomen opened, the Intestines and Integuments being removed. AA shew the upper Part of the Bladder, properly called its *Fundus*, covered with the Peritonæum, which lies next to the Abdomen, and touches the Intestines. The Extremity or Bounds of which Part of the Peritonæum is limited by the Letters *aaaa*. BB is the right side of the Body of the Bladder itself greatly distended, being connected to the abdominal Muscles, and does not communicate with the Cavity of the Abdomen, but is distinctly separated from it by the Limits of the Peritonæum marked *aaaa*; so that if the Bladder be divided within the Bounds marked *aaaa*, the Urine cannot enter into the Cavity of the Abdomen, but runs off without side of the Body, and over the *Offa Pubis* in the high Operation, where *bb* denotes the Part of the Bladder divided in that Method, in which Place Wounds penetrating into the Bladder are not fatal. CCC the right umbilical Artery; DD the *Urachus*; E the *Os Pubis* covered with Part of the Integuments; F the broad Ligament

^a The Method of filling the Bladder with Water, or some proper Liquor, for this Operation, was first taught by ROSSETUS, in *Lib. de Partu Cesareo*, p. m. 263 & seq. Edit. Paris. Anno 1590. But that this is not always absolutely necessary, may be concluded from Instances given by FRANCUS, ROSSETUS, and others, as we shall presently observe more particularly.

^b GARENGEOT in Tom. II. Pag. 274. of his *Surgery*, says, that the Bladder is (*bors du ventre*) without the Abdomen; which seems, in my Opinion, to be a false Assertion. The Bladder is indeed, especially when collapsed, without-side the Peritonæum, but not without-side the Abdomen; because it is situated in the *Pelvis*, which is that lower Cavity of the Abdomen formed by the *Offa innominata* and *sacrum*: but this is allowed by the general Consent of Anatomists, to be Part of the Abdomen. Therefore any Part situated in the *Pelvis* is also situated in the Abdomen.

of the Liver; G Part of the Liver itself; H Part of the right Kidney; I Part of the right Ureter; K K Part of the *Membrana Adiposa*; L the left pyramidal Muscle; M M the left *rectus* Muscle. Fig. 4. is intended to represent the whole Abdomen opened, and chiefly the Bladder, moderately, or but little distended. A A A A A is the Body of the Bladder covered with the Peritonæum, the wounding of which is generally fatal. B B B denote the Part of the Bladder, which is without the Peritonæum, the Bounds of which being terminated by the Line C C C, and the Margin of the *Offa Pubis* D D, it takes in but a small Compass: whence may be learned, how cautiously a Surgeon ought to proceed in cutting for the Stone in the high Operation, when the Bladder is but little distended; and in what Manner the Bladder should be then carefully incised or divided by a narrow Scalpel. For if the Bladder be wounded in that Part of its *Fundus*, which is covered with the Peritonæum, so as to transmit the Urine into the Cavity of the Abdomen, the Wound is then mortal, or incurable: it should be therefore divided only in that Part, which lays uncovered with the Peritonæum marked B B B. E E denote the Intestines.

XI. This necessary Account of the Parts being thus premised, without which no body ought inconsiderately to undertake the Operation, we shall now proceed to describe the Operation itself. The Patient having been duly prepared beforehand for the Operation, by a proper Regimen, Diet, &c. ^a is to be, at the Time appointed, first laid in such a Posture upon the Table or Bed, that his Breech may rise a little higher than his Head, in which Posture his Head, Arms, Legs, and Breast are to be held firm by strong Assistants; without trusting to Ligatures, lest the Patient should be injured by his struggling: upon which Account also some prefer the Bed to a Table ^b. Under his Head should be placed a Pillow, so that his Back may be hollow, that the abdominal Muscles may, by that Means, be in some Measure relaxed. Then a Silver Catheter adapted by one End to a flexible leathern Tube, *Tab. XXX. Fig. 5.* A A, D D D, is to be gradually and slowly introduced into the Bladder. Instead of the leathern Tube may be used the Windpipe of an Indian Cock, according to DOUGLAS; or the Ureter of an Ox, according to CHESELDEN. To which is to be fastened the Tube C, to be afterwards fitted to a large Syringe: by which Means such a Quantity of warm Water, Milk, or Barley Water is to be gently thrown into the Bladder, as the Patient can well bear, without giving him Pain or Uneasiness, or rather till the Bladder appears full and sufficiently distended ^c. This being rightly performed, the Catheter is then drawn out of the Bladder; and the Penis with the Urethra is in the mean Time compressed by an Assistant, or it may be tied with a broad Tape. Then standing on the right Side of the

Method of
performing
the High
Operation.

^a Of what great Consequence this kind of Preparation may be to the Patient, has been shewn both from Reason and Experience by Dr. MIDDLETON in his Treatise on this Method.

^b CHESELDEN in his Treatise on the High Operation, p. 6. MORAND and WINSLOW in *Lib. de Alto Apparatu*, pag. 232 and 331. and particularly ROSSETUS, p. 270.

^c Some Surgeons, and particularly GARENGEOT, direct the Bladder to be filled till it can be perceived distended above the *Offa Pubis*. But I have experienced that this can hardly be perceived in dead Subjects, nor even in the living, because of the Pain and strong Contraction of the Muscles: to which we may add, that CHESELDEN gives an Instance of the Bladder being broke by injecting too much Water. And the Distention of the Bladder by blowing in Wind with a Pair of Bellows, as SOLINGEN advises, is rejected by ROSSETUS as both useless and pernicious.

Patient, my Method is to direct a prudent Assistant to insert his Index and middle Finger into the Patient's Anus, in order to elevate the Stone and Bladder, or press them against the *Offa Pubis*: in the mean time I make an Incision with a small Scalpel, *Tab. XII. Fig. 14.* first thro' the Skin and Fat, and then by Degrees thro' the abdominal Muscles in the right Line, immediately above the *Offa Pubis*, a little on one Side of the Bottom of the *Linea alba*, or even in the *Linea alba* itself^a, (see *Tab. XXX. Fig. bb* or *Fig. 4. BC.*) The external Wound ought to be about three Fingers breadth long in Children; but in Adults it may be four Fingers, or a Hand's-breadth. Then inserting the Fingers of either Hand into the Wound, particularly the left Index, I thereby feel the Bladder distended with Liquor immediately above the Margin of the *Offa Pubis*; at their *Symphysis*; which is yet not easily to be discerned, when the Bladder is not much distended, the Muscles being rigid, or convulsed, and the Bladder itself perhaps harder than usual. I then make an Incision with the same Scalpel, or with a falciform one, having a sharp Point, in the Body of the Bladder immediately above the *Symphysis* of the *Offa Pubis*; or else, as I once practised with Success, I make an Aperture in the Bladder with the triangular Needle or Bodkin called *Trocar*^b, without the Cannula, *Tab. XXIV. Fig. 2.* But this should be done very cautiously when the Bladder is very little, or not at all distended, for fear of wounding the *Fundus* of the Bladder. Then inserting the Fore finger of my left Hand into the Perforation, I therewith gently remove the Peritonæum backward from the *Offa Pubis*, upon which it lies almost incumbent; and this to avoid injuring the Peritonæum, or the *Fundus* of the Bladder. I then pass a small Incision knife obliquely behind the *Offa Pubis*, not into the *Fundus*, but the Body of the Bladder towards its Neck, in such a Manner that I make the Incision only with the Point thereof. This done, Part of the injected Water, Liquor, or Urine retained in the Bladder, immediately flows through the Wound. A slender Incision-knife is used to perforate the Bladder here, because a broad one might easily wound its *Fundus*, and render the Operation fatal. Through the Perforation or small Wound, I then pass a crooked or straight Scalpel, but armed with a Button at its Point, and by elevating the Knife, enlarge the Wound for the Breadth of one or two Fingers, according to the Size of the Patient: and in this Method it is not easy to wound the Peritonæum, or Fundus of the Bladder, but the opening is made in its Body only about its middle, and towards the Neck, *Tab. XXX. Fig. 2. BB.* But the Peritonæum marked AAA, *Fig. 2, 3, and 4.* is left intire without the least Puncture. There are some Surgeons, who advise the Incision to be made from the upper Part of the Bladder a little below the *Urachus*, and to be continued from thence to the

^a Some Surgeons, and particularly GARENGEOT, say, that it is dangerous to make the Incision in the *Linea alba*, which should be therefore cautiously avoided. But this appears to be a vain Caution, both from Experience, by which myself and many of the most eminent Lithotomists have found, that the Incision will heal, as well in this Part, as in the muscular, as also from the Authority of M. WINSLOW, who pronounces it to be an useless Caution. Vid. MORANDI *lib. de alta Operatione*, pag. 92, 209, 235, 336, 350.

^b This Method is not described by any that I know of.

Os Pubis at one Section^a. At the same time they condemn this Method of mine as dangerous, tho' I took it from ROSSET and DOUGLAS: and they also say, that all or most of the Danger in the Operation, consists in making this Incision^b; which I readily grant them. But as we can hardly ever be certain how far the Bladder is distended, and whereabouts that Place is under the *Ura-chus*, which they would have divided, I must needs think the Method here proposed by me to be the safest; especially when the Incision is made slowly and cautiously with a blunt-pointed Scalpel, or one that is armed with a Button, tho' that is also rejected by some of them. By this means I never wounded the Peritonæum, tho' I have justly performed the Operation in several Cases, where the Bladder hath had little or no Distention: whereas, on the contrary, those who make their Incision from above downward, generally wound the Peritonæum^c, which is attended with grievous Symptoms, and the Death of the Patient, notwithstanding they had taken care to distend the Bladder well by injecting some Liquor. But my Method of dividing the Bladder succeeds as well in those Cases where it is distended with Liquor, as when it has little or nothing in its Cavity; and is therefore preferable in all Cases: whereas their Method is not well practicable, but when the Bladder has been distended to a great Degree. Hence my Method has been preferred to theirs by THIBAUT, a late celebrated Lithotomist at *Paris*, as WINSLOW and MORAND^d inform us. When I have just perforated the Bladder sufficient to admit my Finger by the Side of the Scalpel, I generally introduce my left Fore-finger, and bending it in Form of a Hook towards its *Fundus*, I gently draw that Part and the Peritonæum upwards toward the Navel, and then enlarge the Wound downward with the Scalpel, by directing it towards the *Ossa Pubis* and Neck of the Bladder; whereby the opening is generally made sufficiently large. In the mean time I also introduce the Fore-finger of my other Hand into the Bladder, and therewith examine the Size and Situation of the Stone; or whether, if it be large, there will be any Occasion to dilate the Wound still more. When these have been considered, if I find it necessary to further dilate the Wound, leaving my Finger still in the Bladder, I elevate the same a little, and enlarge the Wound either upward, or downward, or both, as far as may be safely without wounding its *Fundus*, 'till I think it sufficient for the Extraction of the Stone^e. But if the Stone be small, and the Incision already sufficiently large, I then lay aside the Knife, and desire the Assistant, who has his two Fore-fingers inserted in the Patient's Anus, to press the Bladder and Calculus forwards as much as possible: during which I endeavour to extract the Stone by my Fingers, when it is small; and when they are insufficient, or the Stone large, I introduce the Hook, *Tab. XXVII. Fig. 10.* or the Stone Forceps, according as it may be more or less conveniently taken hold of by either^f. In some Patients, who were fearful of having Water

^a See CHESELDEN on the High Operation, MIDDLETON pag. 17, 18. MORAND Tr. de *Alto Apparatu*, pag. 33. 94.

^b MIDDLETON loc. cit. pag. 20. MORAND, p. 100.

^c Vid. MIDDLETON, pag. 35, 36. and MORAND pag. 131, 134.

^d MORAND lib. de *alt. Op.* pag. 333.

^e Some would insinuate, that it is neither practicable nor safe thus to enlarge the Wound after the first Incision: but it may be securely performed with the obtuse pointed Scalpel.

^f M. DENYS reckons it one of the Defects of this Operation, that the Stone may be sometimes extracted by the Fingers; which in my Opinion ought to be esteemed one of its greatest Advantages.

or any other Liquor injected into their Bladder, I have ordered a large Quantity of Tea to be drank, keeping a Stricture upon the Urethra in the mean Time, by the Yoke or Instrument represented in *Tab. XXVI. Fig. 9.* that by this means the Bladder may be naturally distended: and I have thus commodiously incised the Bladder, and extracted the Stone, notwithstanding some deny it to be possible^a. In Patients where the Stone cannot be extracted thro' the Peritonæum, which Case has twice occurred to myself; and where the Bladder can neither be distended by injecting Water, nor retaining the Urine by Reason of the Wound made, which has happened also to GREENFIELD, and I believe FRANCUS; in that Case, having carefully divided the Skin and Fat, betwixt the *recti* Muscles of the Abdomen, I then cautiously insert the Fore-finger of my left Hand between the *Os Pubis* and Membrane of the Peritonæum (for which consult *Tab. XXX. Fig. 4.* and COWPER's *Anat.* or BIDLOW's *Tab. 41. BB.*) and thereby thrust it back from the *Ossa Pubis*, that I may have room to make first a small Incision, and then a larger, in the Body of the Bladder; and thereby extract the Stone, without injuring the Peritonæum, or *Fundus* of the Bladder. This Method of performing the Operation without distending the Bladder, is not taken notice of by any that I know of, who have writ on the high Operation, notwithstanding it may be very useful, and even necessary in some Cases; and that therefore distending the Bladder by injecting some Liquor, is not so necessary to the Operation as many have imagined. Tho' it must be owned, that more Caution and Diligence is required in this Way, than when the Bladder is filled with some Liquor.

Whether
the Fundus
of the Blad-
der may be
divided.

XII. Some Surgeons tell us, that the *Fundus* of the Bladder is to be divided in this Operation, and that the Stone is to be extracted that Way: among which Authors GARENGEOT is the principal in both Editions of his Chirurgical Operations. But this is a bad and even dangerous Advice, being a false and erroneous Assertion arising from a wrong or imperfect Knowledge of the Bladder and its Parts. We may also observe, that GARENGEOT in his *Splanchnologia*, treating on the Bladder, does not say one Word of its Parts, and the Manner of dividing it; tho' it be of the last Importance to Beginners in Chirurgical Operations and Wounds where the Bladder is concerned, and more especially with regard to the several Methods of Lithotomy. Others divide the Bladder wrongly into two Parts only, its Neck and *Fundus*, omitting its Body: and these, in describing the high Operation, tell us, that the *Fundus* of the Bladder is the Part to be incised; which, as we have before observed, is by the general Consent of the most prudent Physicians, allowed to be mortal: because the Urine has then a Passage into the Cavity of the Abdomen, and, by its Putrefaction

^a This Method of filling the Bladder has been proposed by ROSSETUS pag. 269 and 275, and particularly by plentiful drinking Spaw-waters, or some other diuretic Liquor: but I do not know that any, either of the *French* or *English*, have followed his Advice, and taken up the Practice. Yet that it may succeed, will appear not only from Cases of my own, but also from a remarkable one of PROBISCHUS, who cured a Lad of twelve Years old by this Method, notwithstanding he wounded the Peritonæum to such a degree, that the Intestines prolapsed, as he tells us in a *German Tract de Operatione Alta*, Anno 1727. But WINSLOW advises for the Patient to use himself to retain his Urine for a considerable Time after drinking plenty of Tea, and, for several Days before the Operation, to cause a gradual Expansion of the Bladder, MORAND p. 310.

and Acrimony, destroys the Patient. If we would therefore consider the Parts of the Bladder distinctly, we ought to divide it into its Neck, Body, and *Fundus*, as I did many Years ago in my *Anatomical Compendium*, considering it as a Pitcher or Jug, to which RIOLAN^a and other Anatomists have very aptly compared it; in which Vessel there is the Neck, the capacious Body of it, and the Bottom, upon which it stands. But it would appear absurd to any one to call the Body of the Pitcher, which follows its Neck, the Bottom of it, since by the Bottom of it is commonly understood the lowermost Part of the Pitcher opposed to its Neck and Mouth: and so in the Bladder, which represents a Pitcher or Stone-bottle inverted, we may reason in the same manner. See *Tab. XXIX. Fig. 8.* or *Tab. XXXII. Fig. 1, 2.* Therefore (in *Tab. XXIX. Fig. 8.*) the Letters AA denote the Neck of the Bladder; BB the Body, or Bladder itself; and C its Fundus, tho' that Part is in our erect Posture uppermost: D the prostate Gland; EE Part of the seminal Vesicles in a Lad or Boy under twelve Years of Age. Otherwise as the Bladder is commonly considered out of the Body, that Part by which the Butcher inflates it is termed the Neck, the Part opposite to this, its *Fundus* or Bottom, and the Part intercepted betwixt these two is justly called the Body, or Bladder itself; which is the Part to be divided in the high Operation, and not the *Fundus*, which has been rightly observed by ROSSETUS above an hundred Years ago^b. As in cutting for the Stone by the *Apparatus Minor* of CELSUS, and by the Lateral Operation, the Body of the Bladder is divided in the inferior lateral Part of its Face, which by some is not improperly called its Basis. *Tab. XXIX. Fig. 1.* So in the high Operation the Body of the Bladder is divided in the middle and lower Part of its Face, as in *Tab. XXIX. Fig. 8. litt. BB.* and *Tab. XXX. Fig. 2. BB.* But in no Method is the *Fundus* of the Bladder divided. For whenever the *Fundus* of the Bladder, *Tab. XXX. Fig. 2, 3, and 4. AAAA*, or that Part of it next the Intestines, which is covered with the internal Lamina of the Peritonæum, is divided or perforated, so that the Urine may pass thro' the Wound into the Abdomen; in that Case the Wound certainly proves fatal, as we observed before. Therefore no Regard is to be had to those who rashly tell us, that the *Fundus* of the Bladder should be divided in the high Operation; even tho' they ascribe their Opinion to ROSSETUS, who never entertained any such Thoughts, but only directs the Body of the Bladder to be incised betwixt its Neck and *Fundus*, where it is not covered with the Peritonæum, as is before demonstrated. The great Anatomist RIOLAN has discoursed so distinctly concerning the Neck, Body, and *Fundus* of the Bladder, that it seems surprizing to me, that the Generality of the modern *French* Surgeons should have altogether neglected the Distinction, (which in my Opinion is of the highest moment) and inconsiderately declare as a matter of no Consequence, that the *Fundus* of the Bladder is to be divided. Most of the *English* Surgeons, on the contrary, are of the Opinion with myself and ROSSET, that the Body only of the Bladder should be incised; as may appear by one Instance among many, taken from the Words of MIDDLETON, translated into *French* by MORAND, when he says: "If the Incision in the Body of the Blad-

^a Anthropographia, Cap. XXII. de Vesica.

^b Lib. de partu Casareo, p. m. 261, 271, 272. edit. Paris. Anno 1590.

“ der is sufficiently large,” (*quand l'incision dans le corps de la vessie est suffisamment étendue*) &c.

What is to
be done after
the Opera-
tion.

XIII. The Stone being extracted according to the Directions I gave at N° X. the next thing to be done by the Lithotomist is to pass his Fingers into the Bladder, to search if any thing yet remains there which ought to be extracted: which may be better done in this way of cutting than any other. If nothing can be found, the Wound being covered with a Linen Cloth, or Compress, the Patient is to be then laid upon the Bed, and the Wound dressed with some dry Lint laid upon the Cloth, which is to keep it from slipping into the Bladder: and the whole is to be retained by a Compress, and a large Napkin folded together, and applied round the Abdomen, in the same Manner as is usual in other Wounds of that Part. Within a few Hours after the Operation, the Wound is to be again dressed with scraped Lint spread with some digestive Ointment, and retained with an Emplaster; over which should be applied a thick Compress wetted in *Aq. Calc. cum Spir. Vin. Campb. Lap. Medicamentos. & Sal. ammoniac. admixt.* or in warm Wine, in which hath been boiled some discutient Herbs: which being applied round the largest Part of the Abdomen, should be frequently renewed, and retained by a Napkin fastened tight round the Body. This Process should be continued often for the first four or five Days after the Operation, to prevent any violent Inflammation. Thus with Care and diligent Attendance the Wound will come to Suppuration, and be perfectly cleansed within the Space of seven, eight, or more Days in young Men and Boys, and sometimes even in old Men of a healthy Constitution: and then the Wound is to be dressed once or twice in a Day with *Lin. Arcei*, or *Bals. Capiv.* &c. and the Lips of the Wound should be brought and retained together by sticking Plasters judiciously applied, as in the dry Suture. But a more early Application of these Plasters I take to be not only useless, but pernicious inasmuch as they prevent or retard the cleansing of the Wound. Over the Plasters it will be proper to apply an uniting Bandage, or the Napkin in Use before may be now fastened a little tighter round the Abdomen: and thus things should be continued till the Bladder and Lips of the Wound are united, and the Urine entirely discharges itself by the natural Passages. And this Agglutination of the Wound succeeds sometimes in three or four Weeks, and sometimes longer, more or less according to the Patient's Age, Habit, and other Circumstances.

What is to
be observed
farther.

XIV. When the Patient is so well recovered as to be able to rise out of Bed, sit up, and walk about, I do not deny them in those respects some refreshment when they have a strong Desire for it: nor do I rigidly confine them to lie always on one Side or on their Backs, as some do, to the great Uneasiness of the Patient, and without any visible Advantage. Among those whom I have cured by this Operation, I remember a Lad of thirteen Years old, who, being fatigued with long lying in Bed, left his bed without my Leave on the seventh Day after the Operation, and continued to sit up, and walk about for some time, without any apparent ill Consequence, the Agglutination of the Wound in the mean time succeeding very well: and he was perfectly cured in the fourth Week. In some Patients the natural Passage of the Urethra is obstructed with a sandy and mucous Substance, so that the Urine cannot make its Exit
that

that Way: in which Case the best Method is to lay the Patient on one Side, and inject warm Water through the Urethra into the Bladder, by which Means the offending Matter may be expelled through the Wound. Or instead of injecting Water, a Blow-pipe may be inserted into the Urethra, and the Matter thereby inflated into the Bladder, to be afterwards discharged at the Wound: by either of which Methods the Urine generally passes afterwards in its former Course by the Urethra. This Artifice was first practised by RUNCIUS, an eminent Surgeon at *Breme*, after he had seen me perform the same Operation with Success in the same City. If the Calculus should be broke in the Attempt to extract it, it may be then taken out with the Fingers, and extracted in pieces: or if that cannot well be performed, ROSSETUS has contrived a convenient Instrument in the Form of a narrow Spoon, incurvated in a particular Manner, as he represents. (*pag.* 280) whereby the Stone and Sand, if there be any, may be easily drawn out. To facilitate and promote the Agglutination of the Wound, ROSSETUS advises the constant Retention of a Catheter in the Urethra, that the Urine may always meet with a free Passage to flow out of the Bladder, without passing through and offending the Wound. In Imitation of which M. MORAND has contrived a short Catheter, from whence he promises to himself great Advantages. See his Treatise on the High Operation, *p.* 240, and 254. where a leaden Probe was introduced, which had been before recommended by LE DRAN, *pag.* 341.

XV. Lest any body should think, that this Method of cutting for the Stone was contrived without any manner of Necessity, we shall briefly consider the chief Advantages thereof, and enumerate the Particulars, wherein it seems to excel the foregoing Methods. And first, as in this Operation there is no Wound made in the Sphincter, or Neck of the Bladder, prostate Gland, or Urethra, which are also neither of them in the least injured by the Knife, Forceps, or other Instrument. There is therefore not the least room to fear an Incontinency of Urine, or a Fistula in the Urethra and Perinæum from that Quarter: with which Disasters those who are treated by the *Apparatus Major*, or even in the lateral Operation are usually afflicted. 2. When the Stone is large and rough, or angular and prickly, the Neck of the Bladder and prostate Gland are then violently contused, lacerated, and injured, as well in cutting by the *Apparatus Major*, as in a somewhat less Degree by the lateral Method; in consequence of which there generally follows violent Pains, Inflammation, and incipient Mortification in the Bladder, which usually terminate in Convulsion; and Death^a. Whereas in this Method, where the Wound is made in the anterior Part of the Body of the Bladder, immediately above the *Ossa Pubis*, those malignant Symptoms in the Neck of the Bladder and Urethra are not in the least to be feared. 3. And for the same Reason too, the Parts subservient to Generation, as the prostate Gland, Muscles of the Penis, and seminal Vesicles, with their excretory Duct, &c. are not subjected to receive any Injury by this Method: which Parts being wounded or hurt by the *Apparatus Major*, or in the lateral Operation, the Patient is often thereby rendered sterile, or at least not so capable of the conjugal offices. 4. Neither the Ureter, Rectum, nor any large Blood-

The Uses
and Advan-
tages of this
Method.

^a To prevent this, DENYS advises to desist from the Operation if the Stone be found angular or prickly. But then the Patient continues *statu quo*.

Vessels are endangered in the High Operation of FRANCŒUS, tho' they may be easily wounded in the other Methods, and thereby a dangerous Hæmorrhage, and other bad Symptoms brought on: because there are only a few small Vessels distributed in the superior Part of the Bladder; and the Intestinum rectum, with the Ureters, are far enough off from the Wound. 5. If the Calculus appears from certain Signs to be rough and sharp-pointed, (which we may know partly from the violent Pains and frequent Discharge of bloody Urine, which it occasions, as well as from the Touch by the Finger *in Ano*) the Extraction of it is then scarcely practicable with Safety, either by the *Apparatus Major*, *Minor*, or by the lateral Operation, as is confirmed by Reason, and repeated Instances in Practice: whereas by this Method the Extraction may be very commodiously performed, as there is an ample Aperture made in the Bladder, which may be still further enlarged upon Occasion, according to the Size and Nature of the Stone. 6. This Method of cutting may be performed with fewer Instruments than either the *Apparatus Major*, or the lateral Operation, and the Stone may be often this way extracted with the Fingers only: and the more simple Methods of operating are always preferred by the judicious to those which are more complex and difficult. 7. Neither the Bladder nor Urethra are in this Method molested, or irritated by Catheters, which frequently occasion Pain, Inflammation, and other bad Symptoms, as TOLET^a, and others acknowledge. 8. If the male or female Conductor be thrust into the Bladder a little too forcibly or deeply in the *Apparatus Major*, or in the lateral Operation, it is thereby frequently wounded, if not absolutely perforated, which last is mortal, as GARENGEOT^b asserts: which in the *Apparatus Altus* is not in the least to be feared, as those Instruments are never used in that Method, there being no Occasion for them. 9. Nor is there any Necessity to bind the Patient with Ligatures, to secure him in so formidable a Posture for the high Operation, as must be for the *Apparatus Major*; whereby the weak Patient has been sometimes observed to be almost killed with Fear before the Operation is begun^c. 10. We can in no Method insert our Fingers so easily, nor so far into the Bladder as in this; and therefore we cannot in the other Methods so well inform ourselves concerning the Size, Figure, or Number of the Stones, with the most convenient Method of extracting them, and whether the Bladder is absolutely cleared of them: all which may be more certainly and commodiously performed in the high Operation. M. DENYS, the great Patron of the *Ravian* Method of Lithotomy, confesses, that small Stones cannot indeed be easily found in the lateral Method of RAW: but that, says he, is a Defect in common to all the Methods. But the *Apparatus Altus* cannot be said to labour under the same Defect; for in that Method even small Stones may be easily found, as we often know by Experience, and as he himself acknowledges soon after, in *pag.* 117. When the Stone is so small, that it cannot be found, nor taken hold of in the lateral Method, the same Author (*pag.* 130.) advises the Lithotomist to relinquish the Operation; whereas

^a Lib. de Lithotom. Cap. XIII.

^b Tom. I. Edit. 1. Cap. de Lithotom. *pag.* 352. An Example of this kind may be also seen in SAVIARD, *Obs.* 37.

^c Vid. WINSLOW's Epist. in MORAND. lib. de *Alto Apparatu*, *pag.* 331.

he might readily extract it by the *Apparatus Altus*. Nor are we as yet furnished with any Instance, in which a small Stone could not be extracted by the high Operation, so as to frustrate the Proceedings of the Operator: The *Apparatus Altus* is therefore much preferable on this account to the lateral Method of Lithotomy. 11. If the Stone should adhere or grow to the Bladder (which tho' denied by ROSSET, DOUGLAS, and others, is yet confirmed by the Experience of MIDDLETON and THORNHILL^a, a remarkable Instance of which, among many others, has occurred to my own Observation, a Description of which may be seen in my Dissertation *de Alto Apparatu*, pag. 43.) it may very often in that Case be separated by the Fingers in this Method^b. But, if it appears too large to be extracted, we do not hereby torture the Patient to Death, as is often done in the other Methods of Lithotomy: but being perfectly convinced of the Case, we judiciously desist in Time. 12. The Stone is not easily to be broke in this Method of extracting it, as in the *Apparatus Major* is frequently done; because in this Method the Extraction is not made thro' so narrow an Aperture, the Wound being of itself sufficiently large, and still capable of a further Extension, as the Bladder is more dilatable in its Body than towards its Neck. And if the Stone should be broke in this Method, from its being of too soft a Texture, the Fragments of it may be more easily and certainly extracted, either by the Fingers, Scoops, or other proper Instruments, than in any other Method of Lithotomy, even with the Consent of the most eminent of the *French* and *English* Surgeons. 13. Stones of a longitudinal Figure, situated in a transverse Position in the Bladder, are of all Stones the most difficult to extract, and not without great Pain and Danger, if at all in the common Method of Lithotomy: whereas in the *Apparatus Altus* there is no such Difficulty or Danger, as it may be more securely taken hold of in its least Diameter. 14. If the Stone cannot be found or extracted in the *Apparatus Major*, or in the lateral Operation, from its being concealed in some Fold or Cavity of the Bladder, such as hath been observed by RIOLAN^c, or from any other Cause; or if the grooved Catheter cannot be passed into the Bladder, because of some Inflammation, or Tumor in its Neck, or at the prostate Gland, or from the exquisite Pain, Hardness, a Tubercle, or Stone in the Urethra, or Neck of the Bladder^d, or from a Phimosis, or intense Stricture of the Prepuce; or if the Patient utterly abhors, or is averse to the Catheter, Instances of which have been known by myself and others: in all these Cases the *Apparatus Altus* is the only Method of relieving the Patient, as hath been experienced by FRANCUS, GREENFIELD, myself, and perhaps others, and at least the like Accidents may happen hereafter. And therefore upon these and other Accounts the high Operation is preferred to the *Apparatus Major* by CHESelden, MORAND, GARENGEOT, and others. 15. But one of the chief Advantages of this Method of cutting, which is esteemed

^a Vid. MORAND. Tr. de *Alt. Apparatu*. pag. 152. and MIDDLETON pag. 44.

^b Vid. Lithotom. DOUGLAS Edit. II. pag. 65.

^c Anthropograph. Cap. XXIII.

^d An Example of the high Operation being happily performed in a Case where the Catheter could not be passed into the Bladder from a Stone obstructing its Neck, may be seen related in COLETT. in *Lib. de Lithot.* pag. 45. notwithstanding he was a professed Enemy to that Method. See SAVIARD Obs. pag. 203.

so by ROSSET and PIETREUS, is, that it may be more easily performed than any other Method of Lithotomy: insomuch that any young Beginner^a in Surgery may undertake it with a little Judgment; because the Incision is here to be made of no great Depth, but right down thro' the Integuments and Muscles of the Abdomen into the Cavity of the Bladder. But this is true only, when it has been previously filled and distended with some convenient Liquor, without being obliged to observe any particular Meanders or Incurvations of the Urethra. But when, for various Reasons, the Bladder cannot be thus previously filled and distended, then indeed it cannot be esteemed so easy an Operation, but must be attended with some Danger from the Smallness of the Space in which the Incision is to be made into the Bladder betwixt the *Ossa Pubis* and *Peritonæum*, whereby a small Slip or Excess in the Incision may divide the *Fundus* of the Bladder, and occasion a mortal Wound; especially if one should make their Incision from above downwards, *i. e.* from the *Fundus* of the Bladder or *Urachus* towards the *Ossa Pubis*, according to the precarious Directions given by some Lithotomists: for in that Case it may be justly reputed a difficult Operation, requiring the Hand of one well versed in Anatomy and Surgery. It is in Consideration of this Danger that all prudent Surgeons, who have treated on the Operation from ROSSET down to the present Day, have advised a previous Distension of the Bladder with some Liquor, as a thing highly, if not absolutely, necessary to cure the Patient. And for the same Reason the eminent Lithotomist TOLET prudently advises those, who intend to cut for the Stone by the high Operation, first to perform the same frequently upon dead Subjects, and especially (which is worth observing) when the Urine is first discharged; lest he should be incapable of rightly performing the Operation in difficult Cases, where the Bladder cannot be distended without endangering the Patient's Life.

Objections
against this
Method.

First Objec-
tion. that it
is often im-
practicable.

XVI. Before we close this Chapter it may not be amiss to obviate a few of the chief Objections, which may seem to be started with Plausibility by some of our modern Surgeons and Lithotomists against the high Operation; which we shall do, not out of Love for cavilling, but only from a Desire of illustrating the Truth, and of improving the important Operation of Lithotomy. M. DENYS, Surgeon and Lithotomist at *Leyden*, who was formerly Assistant to M. RAW, when alive, and succeeded him in Lithotomy upon his Decease, being at present a strenuous Defender of his Method, tells us^b, that the high Operation is in many Cases impracticable upon many accounts, and that those Patients, who cannot be freed from the Stone, by that Method, might yet be cured by the lateral Operation of RAW. But I should have desired that Gentleman first to have demonstrated, or specified some of those many Cases wherein he asserts the high Operation to be impracticable; and then to have proved it by

^a As it was performed by several at *Paris*, according to the Relation of M. WINSLOW in *MORAND. Lib. de Lithot.* pag. 329.

^b In *Obs. Chirurg. de Calculo & Lithotomia*, An. 1731. in Pref. p. 4. In which Preface he asserts, that he published the Book to favour the World with what Observations he had made in the Practice of the lateral Operation of RAW; and the same thing he repeats again in the Beginning of his Treatise, page 2. But all this he says without doing it; for he does not so much as give us a full Description of the *Ravian* Method, as he had promised, and I expected; but he only endeavours to prove throughout the whole Book, the Method he wrote of was the best, that RAW invented it, and that he himself successfully performed it.

instancing an Example in Practice, in which the Stone could not be extracted by the high Operation, and was afterwards affected notwithstanding by the lateral Method of RAW. For my own Part I can find no such Example: but, on the contrary, I have before observed, that I extracted the Stone from two Patients by the high Operation, when I could not effect the same in *Perinæo* by the lateral Method, notwithstanding I might safely affirm myself perfectly versed in the Practice of it. M. DENYS indeed tells us of a Case, in which RAW could not extract the Stone by the high Operation. (*pag.* 69 and 71.) and of another (*p.* 91, 92.) that happened to the eminent Lithotomist of *Amsterdam*, BORTELIUS: by which last I have often seen this very Method performed with great Parade and Dexterity. The last mentioned Lithotomist indeed grants, that the high Operation may be successfully performed upon some, especially young Children, (and therefore he does not disapprove of it;) but that it cannot well be performed upon all. But even among these I must again say, that I never yet met with an Instance where the high Operation was performed, and the Patient could not be freed from the Stone thereby, though it has in some Cases been very large, (See *Tab.* XXXII. *Fig.* 6.) and therefore such Instances ought to have been produced. Whereas, on the contrary, there are many Cases in which the Stone could not be extracted by the other Methods of Lithotomy.

XVII. The Second Objection raised by the same Author against the high Operation is, that it takes up a longer Time in the Performance than the lateral Method, (in *Pref.* *pag.* 5, and 99.) But if we except the previous Distension of the Bladder, by filling it with some Liquor, the Incision itself, and Extraction of the Stone, may be performed in as short a Time as in the *Apparatus Major*, and lateral Operation, if nothing extraordinary should hinder: and it is apparent to every one, that the filling of the Bladder is not the Operation, but only one of the preparatory Requisites in the *Apparatus*. We also observe, that, in the lateral Operation and the *Apparatus Major*, Obstacles frequently occur, which greatly impede and prolong the Operation; even as M. DENYS himself has confessed, by relating some Observations on this Head, particularly (*pag.* 57.) that M. RAW was one Time three Quarters of an Hour in searching after, and extracting the Stone. In short, I may boldly assert, that the high Operation may in many Cases be sooner performed than the lateral Method: as when the Stone cannot be readily found by reason of its Smallness, or when it lies concealed in some Sulcus or Cavity^a of the Bladder on either Side, or behind the *Offa Pubis*. Whereas in the high Operation it may be no less expeditiously found, than extracted, as there is in that Method Room enough to search into every Part of the Bladder with the Fingers, which are of all Instruments the best Searchers and Extractors; especially if an Assistant, by introducing his Fingers into the Patient's Anus, presses forwards the Bladder and Stone towards the Aperture. But tho' the Stone may be thus readily extracted by the Fingers, sometimes assisted with the Forceps or a Hook, in the high Operation, as DOUGLAS, CHESELDEN, and MORAND acknowledge; yet in the lateral Method and *Apparatus Major*,

Second Objection, that it is longer in performing than the lateral Method.

^a *Foveæ*, or Cavities in the Bladder capable of intercepting the Stone, may be seen in *Tab.* XXXII. *Fig.* 1 and 2, as I once found them in a dead Subject; an Observation of the same kind hath been given us by RIOLAN and others.

the Surgeon is often a long Time searching with the Forceps for the Stone in the dark, and often still longer in extracting it. Besides, to say nothing at present of what DOUGLAS, CHESELDEN, MORAND, and others, have observed on this Head, I have often performed this Operation expeditiously enough, even where the Stones were large and jagged.

Third, that
it is more
painful.

XVIII. The third Objection started by M. DENYS is, that the high Operation for the Stone is more painful than the lateral Method^a. But this does not appear to be true, nor could I ever observe that there is any thing in it. But, on the contrary, I have often known Children to make but little Clamour from the Pain of this Method, in Comparison with what they often make in the lateral Operation, and upon other Occasions. This indeed must be confessed, that when the Stone is very large, and also rough, it then gives the Patient most excruciating Pain. But then this is an Inconvenience that attends all the Methods, but the high Operation less than the rest, as may appear from the large Stone thus extracted, which is represented at *Fig. 1* and *2*, of our Dissertation *de Alto Apparatu*; in the Extraction of which the Patient seemed to have little or no Pain, in Comparison of what they frequently suffer in Lithotomy.

Fourth, that
it cannot be
performed
on small
Bladders.

XIX. Lastly, M. DENYS objects, that the high Operation cannot be performed on all Subjects, and especially Infants and Children, because of the Smallness of their Bladders. But the Operation is so far from being difficultly performed on those Subjects, that when it is executed by a judicious Hand, it generally succeeds the best. Instances of which may be seen in DOUGLAS, CHESELDEN, MORAND, MIDDLETON, and others, upon Boys of only three or four Years old^b. But, what seems a little more reasonable, he objects, (*pag. 99 to 105.*) with GARENGEOT, and some others^c, that it is necessary, in the high Operation, to distend the Bladder so much with Water, that it may ascend a good Way above the *Ossa Pubis*, which cannot be done where the Bladder is small and thick; and that therefore this Method cannot succeed in all Patients. The high Operation may indeed be more expeditiously and securely performed when the Bladder is previously well distended with some Liquor: but I have before taken notice, that if the Bladder cannot be conveniently in this manner distended, as it is not absolutely necessary, the Operation may be performed with Caution, when it is but moderately distended, or even when it is wholly collapsed. Therefore this Preparation ought not to be esteemed as an Incumbrance to the Operation, it being only a Precaution for the more safe Performance of it. For you may observe, that there was none of this Distension of the Bladder made in any of the Cases, where the Stone could not be extracted by the Wound first made in *Perinæo* by FRANCUS and ROSSET, and yet we find that the Stone was happily this Way taken from the collapsed Bladder, without either wounding its *Fundus*, or the *Peritonæum*. Thus also the Operation has been successfully performed by PROBISCHIUS^d and myself, barely by causing the Urine to be retained, by making a slight Stricture on the Urethra, after

^a Loc. cit. *pag. 99.*

^b Vid. COLOT in *Præf. pag. 37.* where he tells us he has cut Children of eighteen Months old by this Method.

^c *Operat. Chirurg. pag. 280. T. II.*

^d See my *Dissert. de Alto Apparatu, pag. 53.*

plentiful drinking of Tea, and without injecting any Liquor by the Urethra^a: not to mention the Instances recited by BERRIER, MORAND, and others, in which the Bladder has been rightly incised, and the Stone happily extracted, when the Bladder could not be thus distended with any Liquor, through the Clamours of the Children, who were not above four Years old.

XX. Moreover, M. DENYS objects, that after the Bladder has been filled, the Penis is obliged to be strongly compressed either by the Fingers, or a Ligature, to prevent the Reflux of the Water before the Bladder is incised; by which Means will be brought on a Tumor, Inflammation, and other bad Symptoms. But I must declare, that no such bad Symptoms have ever appeared under my Observation: nor can I imagine how they should, since a very slight or gentle Compressure will be sufficient to restrain the Liquor in the Bladder; which may be commodiously performed, as we before observed, by the Steel-Instrument, *Tab. XXVI. Fig. 9.* termed a Yoke, designed for an Incontinency of Urine. An Instrument of the like Kind has been also recommended by M. WINSLOW for the same Purpose, which is delineated in NUCKE's *Chirurgical Operations, Fig. 11.* and may be seen in our Surgery, *Tab. XXVI. Fig. 10.* The next Objection is, that the Patient, treated by the high Operation, is obliged to lie constantly on his Back. But this is not true: for they may often turn themselves, and lie on their Sides or Belly, if they have a mind. Which last is sometimes recommended by DOUGLAS, WINSLOW, MORAND, and others, especially after the Parts have been suppurated, in order to promote the Agglutination of the Lips of the Wound. In the last Place he objects, that Sand and Fragments of the Stone cannot be so well extracted in this, as by the lateral Operation. But what is much more advantageous, there need not, in this Method, be any Fragments broke off from the Stone, since the Incision is made very large, and the Stone generally extracted with no great Violence by the Fingers only: insomuch, that I judge it to be one of the principal Advantages of the high Operation, as I have before demonstrated, that the Bladder may be thereby more perfectly cleansed from calculous Fragments and small Stones, if such there should be, than by any other Method of Lithotomy. For that such Fragments and small Calculi are very difficultly extracted by the *Apparatus Major* and lateral Operation, is even acknowledged by M. DENYS himself: whereas in the high Operation, when the Bladder is elevated by an Assistant, the Stone may be very readily found and extracted, either by the Fingers or convenient Instruments; which cannot be so readily done in any other Method as in this, by the universal Consent and Declaration of all Lithotomists, who have treated on the Subject. In *pag. 118.* M. DENYS asserts, that the Patients treated by the high Operation are afterwards troubled with an Incontinency of Urine: which is absolutely repugnant to the Experience both of myself and others. In short, all the Advantages which this Author attributes to the lateral Method of RAW in *pag. 119.* may be also justly asserted of the high Operation. And M. LE DRAN confesses, that large Stones may be more securely this Way extracted,

Other Objections to this Method.

^a This Method of distending the Bladder by retaining the Urine, has been much recommended by M. WINSLOW in *Morandi Lib. de Alt. Ap. p. 319.* more especially if the Patient had used himself to retain his Urine a long Time for several Days before.

In what Cases this Method is less convenient

than by the *Operation Major*: before which Method the high Operation is also preferred by Mr. CHESELDEN on several Accounts.

XXI. But let any body should think, that I only approve of and practise the high Operation, and despite all the other Methods of Lithotomy; I shall conclude this Chapter by enumerating briefly the Cases in which it is less convenient than the other Methods. And, first, it appears from the Experience of myself and others, that this Method of Lithotomy is not successful in old Men, or even such as have passed their thirtieth Year; as such seldom recover according to MIDDLETON, DOUGLAS, and others, to mention no more than M. SMITH, *pag. 91.* whose Words, in this Respect, are very remarkable: *viz. that all above thirty or forty Years old, who have undergone this Operation, have died, except one.* And I myself have cut four, whose Age has exceeded those Years, but none of them recovered. The high Operation is also seldom attended with Success, when the Patient is previously afflicted with some other Disease, especially those who have an Ulcer in their Kidneys or Bladder, are reduced by a Consumption, or have a scirrhus Bladder; in all which Cases the Methods of cutting *in Perineo* are allowed to be preferable to the high Operation by all the Lithotomists who have treated on the Subject: because by the lower Methods the Bladder may be more easily cleansed and consolidated. The same is confirmed by daily Experience, which ought always to be regarded as the best Master. Lastly, the high Operation is more difficultly performed than the other Methods upon such Subjects as have small Bladders; which may be known partly from their containing but a small Quantity of Urine, and partly from the Difficulty of moving the Catheter in the Bladder: in these Circumstances I should therefore advise one, who is not expert in performing this Operation while the Bladder is flaccid, without injuring its *Fundus*, or the Peritonæum, to chuse some other Method. However, the Operation is not impracticable in all small Bladders, as some would have us believe. See N°. XVI. of this Chapter. From hence it is sufficiently apparent, that, according to the different Dispositions of the Patient's Habit, State of his Bladder, the Stone, and other Circumstances, a prudent Surgeon will sometimes prefer one Method, and sometimes another, according as it shall appear more or less convenient. But if any one is desirous of seeing more concerning the high Operation, they may consult DOUGLAS, MIDDLETON, CHESELDEN, ROSSET, MORAND, LE DRAN, and GARENGEOT, who have more largely treated of the Subject: To these they may also add my *Dissertation de Apparatu Alto*, which was published at *Helmstadt* in the Year 1728.

An EXPLANATION of the THIRTIETH PLATE.

Fig. 1, 2, and 3, are taken from Mr. CHESELDEN's Treatise of the high Operation, in order to shew the Position and State of the Bladder when distended with Liquor, preparatory to the Operation. But as these Figures have been explained at large in N°. IX. of this Chapter, we shall refer our Reader thither, to avoid troubling him with a second Repetition.

Fig. 4. Represents the Abdomen opened, the Bladder being moderately, or but little distended, either by the Urine or some Liquor; that hereby may appear how



Fig. 5.



Fig. 2.



Fig. 4.

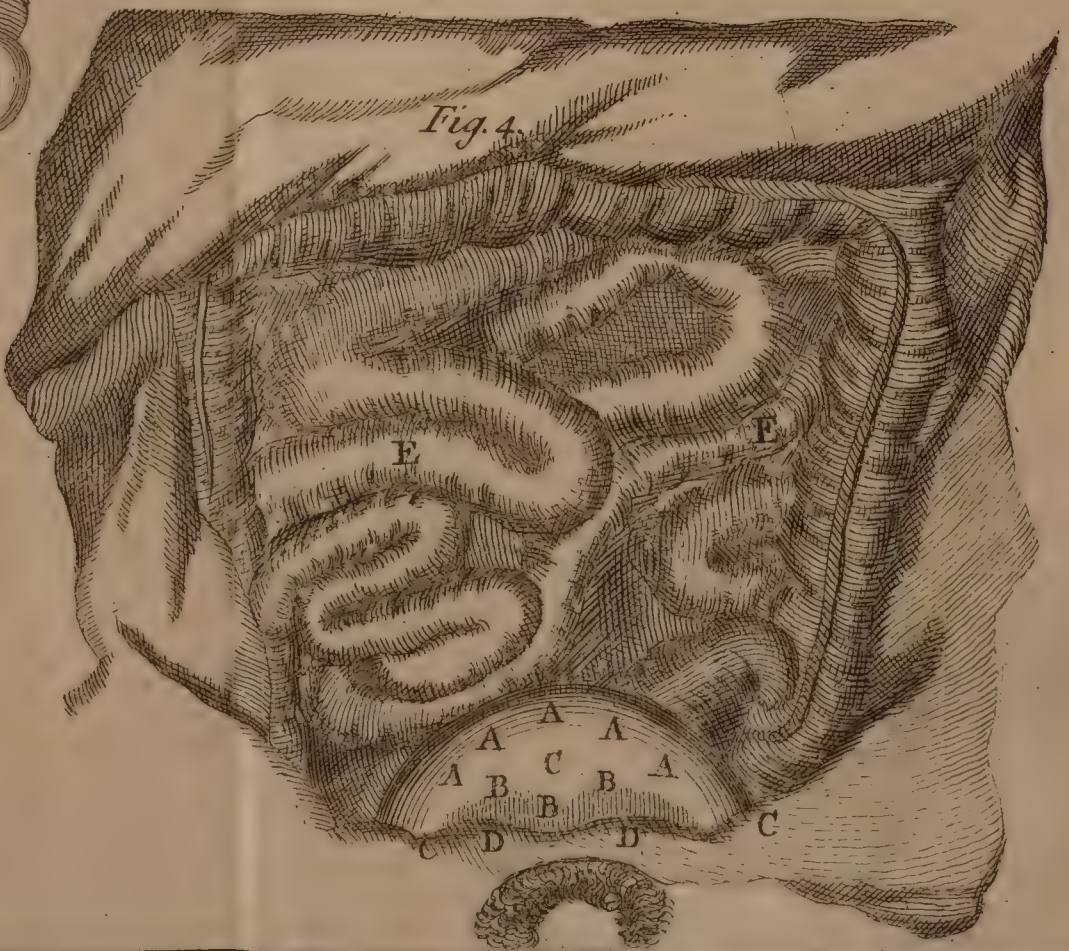


Fig. 3.

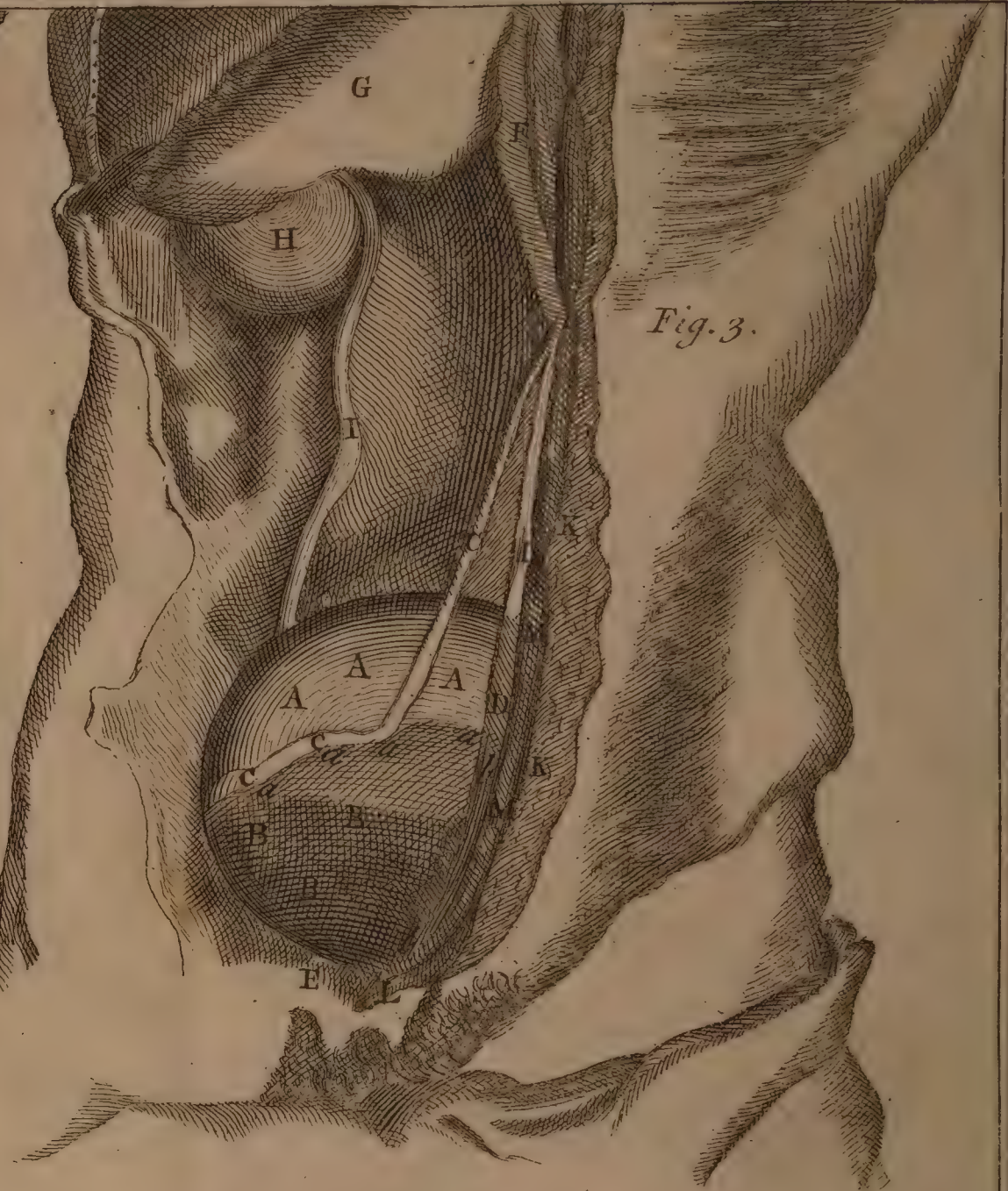
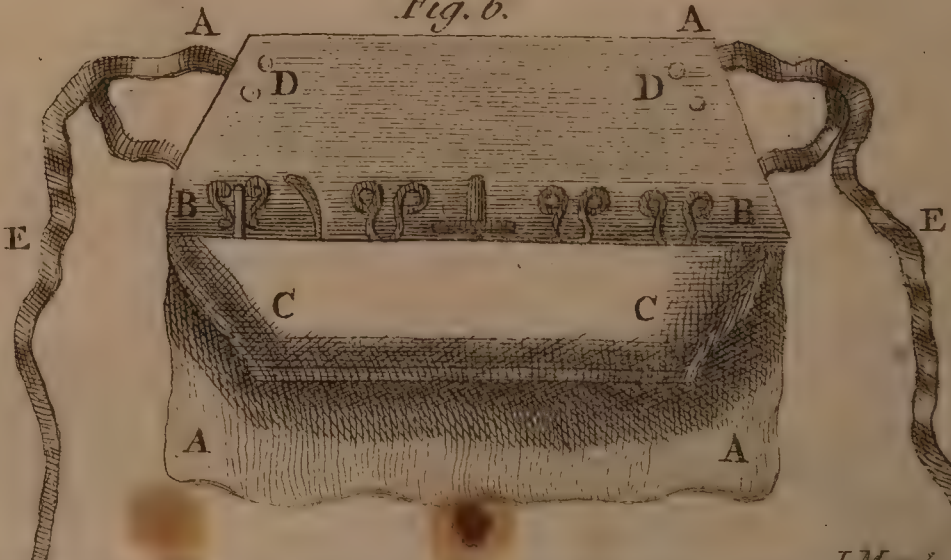


Fig. 6.



how small a Space there is then remaining betwixt the *Offa Pubis* and *Fundus* of the Bladder covered with the Peritonæum, being the Part to be incised by the Lithotomist. But a more particular Explanation may be seen in the Place but now mentioned.

Fig. 5. Denotes the Pipe or Tube, by which the Liquor is to be conveyed into the Bladder, in order to distend it for the Operation; which is also taken from Mr. CHESELDEN. AA is a Silver Catheter, which is passed thro' the Urethra into the Bladder. B the Aperture in each Side by which the injected Liquor enters the Bladder. C a Brass-pipe, which is to be adapted to a sizable Syringe. DDD a flexible Pipe made of Leather, or an Ureter of an Ox, by means of which the inflexible Tube and Catheter are joined to each other: and thus the Injection may be more easily performed, than if the whole was an inflexible Tube, such as was in Use with ROSSETUS. E the Part of the flexible Tube, which is tied with a Thread to the Catheter; where there is also a transverse Handle, which serves to hold the Catheter steady, that it may not hurt the Patient during the Injection.

Fig. 6. Represents the Pouch or Case for holding the several Instruments for Lithotomists, disposed in their proper Order. This is to be fastened round the Lithotomist in the Manner represented at *Fig. 9. Tab. XXIX.* and was always used by RAW, as being more ready and expeditious, than to trust to an Assistant, who may chance to be attending something else. AAAA the Pouch itself; BB the Instruments disposed in their proper Order. CC the Side or Cover to the Case, which may be fastened with the Buttons marked DD, that so the Instruments may be concealed from the Patient's Sight, not to deter him. EE the Strings, by which the whole is fastened round the Waist of the Lithotomist.

C H A P. CXLIII.

Concerning the Artifices used by Frier JAMES, (Frere Jaques) in cutting for the Stone; as also on the lateral Operation of RAW.

I. ABOUT the End of the last Century there was a famous *French* Lithotomist, named Frere JAMES, who, at that Time, frequently performing that Operation in a peculiar Manner, was the Subject of every one's Thoughts and Discourse: and even 'till this Day he has been so much talked of among Surgeons and Lithotomists, that we cannot well pass him by in Silence, without taking Notice both of him and his Method, with the new Artifices which he introduced in Lithotomy. About the Year 1697 this Person, who was an obscure Monk, or Hermit, as some call him, came to *Paris* from some of the Out-parts of ^a *France* in a very miserable Condition, being both destitute of Money, Victuals, and Cloaths; but of an open and free Temper, his

A Description
of the
Peritonæum
Recession of
JAMES at
Paris.

^a Some tell us his Name was BEAULIEU of *Bescançon* in the County of *Franché*; others say of *Beaufort*, a Town near *Bescançon*.

Simplicity of Mind, being judged commendable by some of the *French* Writers. Here he produced and shewed almost every body the many Testimonies of Patients that he had happily cut and cured by his safe and ready Method in the several Provinces of *France*: and tho' his Artifices were yet unknown to any of the Surgeons, he made no Secret of them. As for the Reward of his Labour, he required none, or at most but very little, as much as would repair his Instruments, pay for the mending of his Shoes, or the like. At length he addresses himself to the chief Surgeons and Physicians of the *French* King at *Paris*, desiring that he might have the Liberty of cutting and curing such Patients as were afflicted with the Stone in that City, and the great Hospitals, by his new and as yet unheard-of Method; at the same Time strenuously asserting, that his chief Design, in coming to *Paris*, was to teach them a better Method of cutting for the Stone. Hereupon the Surgeons, and particularly the Lithotomists, were highly displeased, that JAMES should put himself upon a Par with themselves: but being taken with the Address and Novelty of the thing, and partly out of Curiosity, they permitted him to perform the Operation first upon a dead Subject, that had a Stone conveyed into the Bladder.

His first Operation on a dead Subject.

II. The dead Subject being made ready, and many Surgeons and Physicians present, JAMES began his Operation in the following Manner: First, the Body being laid and secured in the usual Posture upon the Table, he then passed an ordinary, or common tubulated (not the grooved) Catheter into the Bladder in the usual Method, and therewith he extruded the Side of the Bladder in the left Part of the Perinæum. He then made an Incision with a Knife a little longer than the common Bistoury, near the Perinæum, but in a Manner somewhat different from the common Practice: for guiding the Knife upwards from the Anus, near which he had entered it, he divided the Parts nearly in a right Line, in the left Side of the Perinæum, about two Fingers Breadth from its Raphe or Suture, the Incision reaching obliquely up to about the Middle of the Perinæum, in which he cut through the Neck of the Bladder, and Part of the Bladder itself, without injuring any other Part of the Urethra. Then passing his Finger through the Wound into the Bladder, he searched for the Seat of the Stone: which done, he passed an Instrument like a Spoon through the Wound, and having thereby introduced a Pair of Stone-forceps into the Bladder, he extracted the Spoon or Conductor. And now, laying hold of the Stone with the Forceps, the Catheter being withdrawn, he extracted the same very dextrously, to the great Admiration of the Spectators, notwithstanding the Stone was nearly as big as a common Hen's Egg.

The Judgment passed on his Operation.

III. The Operation being thus concluded, the Surgeons, upon inspecting the Body, found, that this new Lithotomist had first cut thro' the common Integuments of the Perinæum to about the length of two Fingers Breadth; that the Wound next passed betwixt the Accelerator and Erector Muscle of the Penis, without injuring either of them, till it had reached and penetrated the Neck of the Bladder, and Part of its Body in a right Line for about an Inch, agreeable to the Practice in the *Apparatus Minor*: and, lastly, he had extracted the Stone through this Incision. The Particulars of the Case being duly considered, several of the most prudent Physicians there present, and particularly MERIUS, could not help thinking, that this new Method of Lithotomy

was

was much preferable to the Method of cutting by the *Apparatus Major*, and must be attended with less Danger. For in the common Method of cutting by the *Apparatus Major*, it is not only necessary to divide the Urethra; but the Neck of the Bladder and its narrow Sphincter, together with the prostate Gland, are also violently dilated and confused: and then again, if the Stone should be considerably large, those Parts must be still further injured by the Violence used for its Extraction. However, as the Majority of the most eminent Surgeons and Lithotomists were not fond of promoting new Methods introduced by inferior Hands, we need not wonder that they would not permit the new Lithotomist to perform his Operation on a living Patient.

IV. JAMES finding himself thus coldly received by the *Parisians*, addresses himself to the King's Surgeons and Physicians, who then resided with the Court at *Fontainebleau*: and to them he shews his Letters of Recommendation, and Testimonies of Patients, that he had happily cured by cutting, in the several Parts of *France*; requesting of them that he might be permitted to perform his new Method of Lithotomy upon a certain young Man a Taylor, there afflicted with the Stone, which Request was immediately granted. JAMES performed the Operation according to the preceding Method, so successfully before the King's Physicians and Surgeons, that, to his great Applause, the Patient was, in less than three Weeks time, seen walking about in the *Areas*, and troubled with none of the bad Symptoms, which usually attended the common Method of cutting.

JAMES next cuts for the Stone upon a living Subject.

V. This lucky Instance of his Success brought JAMES to be taken Notice of, and respected by every body, not excepting the King himself, and made most of the *Parisians* look upon him as a Physician sent from Heaven for the Relief of Mankind, by his new and better Method of Lithotomy. Therefore in the Spring following, *Anno* 1698, having obtained the King's Licence, he returned to *Paris*, and performed his Operation upon a great Number of Patients, being always attended with such a Crowd of Spectators, that at last it became necessary to have a Guard of Soldiers to keep the Tumult in Order.

And hereby acquires a great Reputation.

VI. It is to be observed, that JAMES never used any Manner of preparing his Patients for the Operation by Bleeding, Purging, Diet, or proper Regimen, as was customary with other prudent Surgeons and Lithotomists. Nor did he use any Ligatures to secure the Patient, as they did in the other Methods; but the Patient being laid on a Table, with his Legs bent upward, was secured by the Hands of strong Assistants only. In his Extraction of the Stone, he was, by the Report of DIONIS and others^a, so intrepid or rather cruel, that it struck a Horror into most of the Surgeons present, who, tho' they were Men of Courage in their Profession, could not avoid being under Pain for the Patient's labouring under the Severity of his Hand. And, in like manner, he was so careless with regard to dressing, and binding up the Wound after the Operation, and ordering a proper Regimen, that, when the Patients desired him to take care of them in those respects, his answer was generally: "It is sufficient that I have

His Treatment of the Patients.

^a In his Surgery, under the Chapter of Lithotomy. And the same is also affirmed by Dr. LISTER in his Journey to *Paris*; and SAVIARD, *Obs.* pag. 454.

"extracted the Stone, God himself will cure the Wound"^a. He treated Women, that had the Stone, in the same Manner as he did Men, without the least Difference, only he generally wounded their Vagina in cutting them; but that, says he, is a Matter of no Consequence, it is rather what should be done.

The Event
of his Ope-
rations.

VII. But, in order to form a better Judgment of his whole Proceedings in Lithotomy, it will be necessary to consider what was usually the ultimate Event of his Operations, which will generally appear with no good Aspect. If we may believe MERIUS (who was at that Time a celebrated Surgeon in *Paris*, and wrote a laudable Dissertation upon the whole Affair in *French*, which he published at *Paris* in the Year 1700) out of sixty calculous Patients, which were cut by him in the Spring of the same Year, twenty five of them perished, only thirteen of them were cured, and the Remainder of them were left with a Fistula, or an Incontinency of Urine. And M. DIONIS in his Surgery^b writes seven Years after MERIUS, that, in his Time, more than half the Patients, which had been cut, and passed for being cured of the Stone by JAMES, were since deceased of the various supervening Symptoms; and that the Method of cutting used by him was so cruel and imprudent, that it was no Wonder if every one of them had expired. And to add Authority to his Sentence, M. DIONIS alleges, for Instance, the young Man, a Taylor, which, as we before mentioned, was the first that JAMES cut for the Stone at *Fontainebleau*: and though it was thro' him that JAMES acquired so much Reputation, yet the Patient was not only ever after troubled with a Fistula in *Perinæo*; but his Constitution and Body thereby gradually wasting and decaying, there was not two Years passed before he changed a miserable Life for a more welcome Death. Whereas the same M. DIONIS assures us, that, of twenty-two Patients which were cut for the Stone in the same Spring by other Hands, there were only three of them lost, almost every one of the rest being perfectly restored to their former Health.

The Result
of inspecting
his dead Pa-
tients.

VIII. Upon opening and inspecting the dead Subjects, which had been cut for the Stone by JAMES, it was observed by the fore-mentioned reputable Authors, that the Bladder was very often cut quite off from the Urethra; in others they found a Cancer, or an incipient Mortification of the Bladder and Intestines: and in others, the Muscles, Nerves, and Blood Vessels of the Penis had been divided by the Knife^c. In some, the elevating Muscle of the Anus and Blood-vessels from the Hypogastrics were seen cut in sunder; in others, the Back-part of the Bladder was observed three or four Times perforated towards the Cavity of the Abdomen: and in others again, the Wound of the Bladder appeared unequally, lacerated and distorted. In some Patients he perforated the Rectum, so that the Fæces were discharged through the Wound: and in several Women which he cut, he not only wounded the Bladder, but also the *Vagina* and *Intestinum Rectum*, so that it was no wonder several of them had a Discharge of their Fæces thro' the *Vagina*. And, lastly, by his wounding

^a *Je lui ay tiré la pierre; Dieu le guerira.*

^b Published in the Year 1707 in 8vo at *Paris*.

^c Many more Observations relating to this Effect may be seen made in Dr. MARTIN LISTER'S *Journey to Paris*, 8vo, *Lond.* 1699.

some of the adjacent large Blood-vessels, there followed such a Profusion of Blood that the Patient sometimes expired, either under the Knife, or soon after the Operation.

IX. Nor did he always observe, to make his Incision in the same Place, when he cut for the Stone; but he would sometimes divide the Perinæum above an Inch higher or lower than he did at others: so that thro' his Inconstancy and Negligence it was almost impossible for him to avoid injuring some Part or other, which ought not to be touched, every Time he performed the Operation. Besides, what is always a great Impediment to the Practice of Surgery, he was often so unprovided with suitable Instruments, that he has sometimes used a common Razor to cut for the Stone, instead of the Incision-knife proper for a Lithotomist. And I myself have heard the *Dutch* People say, while I was in *Holland*, that when our Lithotomist came thither from *France*, he at first cut a great Number for the Stone; and would sometimes use a common blunt Knife to perform the Operation, when his own Incision-knife was not at hand. If that was the Case, it is no Wonder, that his Patients were so constantly exposed to the most malignant Symptoms, and grievous Disorders. Also while he was at *Paris*, in a Lad troubled with the Stone, the Calculus fixed itself in the Cavity of the Urethra immediately behind the Scrotum in *Perinæo*; notwithstanding which he obstinately cut him according to his usual Method, near the Anus: when it would have been much more commodious to have done it, like other prudent Surgeons, in that Part of the Perinæum, where the Stone offered itself. These, and the like Circumstances, instead of demonstrating him to be a rational and prudent Lithotomist, proved that he was no more than a rash and empirical Practiser: which is still more strongly confirmed, by his being totally ignorant of every thing in Anatomy, and of every Operation in Surgery; unless that he would sometimes undertake the Cure of Ruptures by the Knife, when they occurred to him. But as in that Operation he always deprived the Patient of his Testicle, without any Necessity, like the Generality of Mountebanks; it is thence more than probable, that he learnt his imprudent Artifices of some Empirick or Quack: for he would never, that I could hear of, reveal where he learnt his Art^a.

His other Errors.

X. JAMES having thus imprudently treated such a Number of Patients with the very worst Success; and so considerable a Person as the *Marshal de Luyre* being almost dead, the Day after he was cut, with the most excruciating Pains, but happily preserved by the Assistance of M. FAGON, the chief Physician, and a prudent Surgeon: it naturally followed, that the Reputation of our new Li-

JAMES now begins to come into Disgrace.

^a M. MERI tells us (*in Obs. de Methodo JACOBI, pag. 43.*) that he learned his Art formerly of some Physician: whom I take to have been some itinerant Surgeon, or Mountebank, perhaps not altogether so ignorant as JAMES, who perhaps from his own Imagination, and the reading of CELSUS, or GUIDO, contrived and practised this new Method of Lithotomy, together with Celotomy. This JAMES being a Servant to him, and often assisting in the Operations, was afterwards bold and rash enough to attempt the same himself, tho' utterly ignorant of Anatomy, and every other necessary Qualification. An Instance of the like kind is still within my Remembrance, of a Mountebank that, among other Places, used the Fairs at *Francfort in Germany*, who had a Servant to look after his Horses: but, the Fellow being strong, he often employed him in holding the Patients during his Performance of the Operation for Ruptures and Lithotomy. At length, thinking he had seen enough, he deserted his Master's Service, and set up for an Operator, tho' perfumed with the Stables; and with Success answerable.

thotomist began now to be turned into Disgrace, infomuch that the Generality of the *Parisiens* quickly pronounced him a very ignorant and imprudent Operator. He therefore quitted those Quarters; and, after travelling over most Parts of *France*, he came at last into *Holland*, particularly to *Amsterdam* and *Leyden*: and from thence he went thro' most of the principal Counties and Cities in *Germany*, performing his Operation in all of them, but generally with his former ill Success. But what with his Rashness and Cruelty, the Unfitness of his Instruments, and wilful Negligence, he could not establish any Reputation in those Parts, especially for the first Years: so that he quite lost the Name of a wise and prudent Surgeon, which he at first acquired. However, though Matters then run into so bad a Condition with him, it is worth observing, that he soon after began to alter and improve in his Operation, as I have been informed in a Letter from the celebrated Physician and Anatomist SALTZMANNUS at *Strasburg*; he telling me, that JAMES had there made Emendations in his Method of Lithotomy; and that in the Year 1712, and in the Beginning of 1713, he had successfully cut sixteen Patients in that City, making use of a grooved Catheter: adding, that JAMES had ingenuously whispered him in the Ear, that he had laid aside his former rash Method of cutting; that he had abstained from it above a Year; and that he now treated his Patients in a more judicious Manner. As these Circumstances have been omitted by the Generality, if not by all the Writers on this Subject, they are presumed to be known but by few: and therefore I thought it would not be amiss to insert them here, that nothing might be wanting to compleat the History of our Lithotomist. Agreeable with what I have before related, is the Account we find of JAMES, written by M. FEHRIUS, a Physician of *Switzerland*, in Page 23 of his Dissertation *de Calculo Vesicae, ejusque per sectionem auferendi Methodo novissima, praestantissima & facillima*, published at *Basil*, Anno 1716. In which we read, that out of sixteen, who had been lately cut by JAMES at *Strasburg*, there was only one old Man who died, and that chiefly thro' Age, which was before predicted by him. In the same Treatise, pag. 17 & seq. we also meet with a very distinct Account and Description of the lateral Operation of RAW, long before it was published by ALBINUS, as he had often seen it performed by that Lithotomist. Pretty much the same Account we also find of Frier JAMES's Reformation and Success in Lithotomy at *Strasburg*, published by SCHAFFERUS in a Dissertation, *de variis Lithotomiae Generibus*, pag. 24. printed at *Strasburg*, Anno 1724. In which he ought to have made the Time Anno 1712, instead of 1711, as SALTZMANNUS observes. Much to the same effect also WEISBACHIVS^a, who had lived at *Strasburg*, tells us, that of twenty Patients which he had seen cut by JAMES, hardly one of them miscarried, and that each of them obtained a present Cure without any remaining Fistula. But he neither mentions the Time when, nor the Place where, he had seen this; tho' I suppose it was at *Strasburg*, because that had been the Place of his Residence^b.

^a In his *Medicina Practica, Cap. de Calculo*, written in the German Language; and published at *Strasburg* in the Year 1715, and since often reprinted.

^b It was therefore from *Strasburg* only that I was assured of JAMES's Success in Lithotomy. But however prudent, or rather lucky, he might be in that City, it was not so with him at *Frankfort on*
XI. But

XI. But however imprudent or rash might be the Practice of JAMES in his Lithotomy originally, it is certain that his Method was of this Service, that it gave other more prudent Surgeons and Physicians a Hint of improving their Practice this Way, and even in other Distempers, to the Advantage of Mankind. Thus from this Method of Lithotomy, as DIONIS rightly observes in the Chapter on that Subject, in his *Chirurgical Operations*, we were directed to improve and perfect the Operation of puncturing the Perinæum, to empty the Bladder in a Suppression of Urine. For the Bladder itself might be much more safely and conveniently perforated by the Trocar, than its Neck, as was till then the Practice: which we shall consider more particularly when we come to that Operation. And secondly, the Method of Lithotomy itself used by JAMES, might be performed to very good Purpose by a prudent Surgeon, who is well skilled in the Anatomy of the Parts; notwithstanding it succeeded so badly in the ignorant and rash Hands of that first Operator. But we do not find that M. DIONIS has any where declared the Manner of perfecting this Method of Lithotomy used by JAMES, and of avoiding his Errors.

On what account his Method was of Service.

XII. However, the celebrated Surgeon at Paris M. MERI made it his Business to publish a Treatise on this Method of Lithotomy, in order to persuade Surgeons to come into the Practice of it: though, in a little while afterwards, he used all his Endeavours to dissuade them from it again. But he proposed it with this Improvement: that, instead of the common tubulated Catheter used by JAMES, the Operator should cut upon a grooved Catheter, like that used in the *Apparatus Major*. This grooved Catheter being passed into the Bladder, and then held in the left Hand, he says, is to be next thrust outwards against the left Side of the Perinæum, as was the Practice of JAMES. The Lithotomist must then proceed to cut thro' the Perinæum into the Groove of the Catheter, with a proper Incision-knife, or Bistoury, like what is used in the *Apparatus Major*, so as to divide the Neck of the Bladder with some Part of its Body which lies next to it, continuing the Incision cautiously onward, till the Aperture is big enough for the Extraction of the Stone. Through the Wound thus made, is to be introduced a hollow Conductor into the Bladder, termed by the French a *Gregoret*, in the same Manner as is usual in the *Apparatus Major*: and, lastly, by introducing a Pair of convenient Forceps, the Stone itself is to be extracted. But tho' we must here confess M. MERI to be the first and real Improver of JAMES's Method of Lithotomy, yet we cannot say, that he ever made Trial of it upon any living Subject: but rather soon after he had made this Emendation, he again rejected it, pronouncing it unsafe, and much inferior to the common Method by the *Apparatus Major*. However, I believe he was the primary Occasion of this Method being performed as he had corrected it, by the celebrated M. MA-

It gave Occasion for contriving a better Method.

the Main, in my own Country; as I was informed by an eminent Surgeon, and a Physician of that Place (namely GLADBACHIUS and SUTORIUS) in the Year 1713. For, during his Stay at that Place, which was from the Beginning of the Spring to September, he cut but two Patients for the Stone, tho' many for Ruptures: but a few Days after the Operation, one of the first died in the public Hospital. This made the Surgeons and Physicians at *Frankfort* entertain but a mean Opinion of his Skill: nay they even affirm, that he was a Man at that Time perfectly ignorant in the Sciences, and of good Manners; that he could scarce read or write, and did not so much as know how to apply a proper Dressing and Bandage to the Wound after his Operation. But of this more hereafter.

RESCHALL, who cut by it with Success at *Paris* not long after JAMES; if we may rely on what we find written in Dr. LISTER's Journey to *Paris* before-mentioned: which Passage, in pag. 239, is so extraordinary, that it seems surprizing to me, that it was never taken notice of by any of the *French*, or even *English* Writers on the Subject^a. I shall therefore relate the Affair as I find it in the said Journey of Dr. LISTER, which Account was given him after his Return from *Paris* to *London*, by another learned *Englishman* Mr. PROBY, who still resided at *Paris*, and saw JAMES cut for the Stone there in the Year 1698, August 2. when he sent the Doctor the Letter now mentioned, in which we meet with the following Passage: "That the Surgeons of *Paris* greatly ran down JAMES, notwithstanding they followed his Method. For M. MARESCHALL had, from that Time, cut for the Stone according to JAMES's Method, with only this Difference, that he used a grooved, instead of the common Catheter. And that M. LE RUE, another Surgeon of the Hospital *La Charité* had, at the same Time, cut according to the old Method; but not with such good Success as M. MARESCHALL had practised the Method of JAMES. For that all who had been cut by M. MARESCHALL were then alive, and well: but that M. LE RUE had lost several, and that even those who survived his Method, were not so soon well as the others." But whether or no the same Method was continued, and often repeated by MARESCHALL, or others after him at *Paris*, we have no Accounts; at least none that I hear of. It seems to me a little extraordinary, that none of the *French* Writers should have taken any Notice of this Affair, since M. MARESCHALL died but a few Years ago; and saw the Operation that was first performed by MORAND and PERCHETUS at *Paris* in 1730, according to Mr. CHESELDEN's Emendations, as MORAND himself informs us, in *Memoir. Acad. Reg.* 1731. But M. GARENGEOT declares PERCHETUS to be the first that cut for the Stone by the lateral Operation after JAMES at *Paris*. See his *Operat. Chirurg. T. II. pag. 230.* which may be best judged of and decided by the *French* Surgeons.

Of the RAVIAN Method.

XIII. This new Method of Lithotomy was soon after corrected and revived in *Holland* by the celebrated *German* Physician RAVIUS, or RAW, whom I followed for some Time as my Preceptor in Surgery^b and Anatomy; with whose Name I suppose every body, that knows any thing of the History of Physic, must be well acquainted. For RAW had not only often seen JAMES

^a Mr. DOUGLAS is the only Person that has taken any Notice of Dr. LISTER's Account in his Treatise on the *Lateral Operation*, pag. 37 and 39. But he does not thence infer, that M. MARESCHALL was the first who performed the Operation on a living Subject after JAMES, which follows in Consequence of Dr. LISTER's Words, if true.

^b For from the Spring of 1706 to October of the Year 1710 I lived in *Holland*, and spent most of that five Years time in *Amsterdam*, where I diligently attended on the Operation of RAW. This RAVIAN Method of Lithotomy was published with learned and just Recommendations in the Year 1725 by ALBINUS, Professor of Anatomy and Surgery at *Leyden*, under the Title of *Index Supellestilis Anatomicæ*, together with a Description of the Instruments to be used. However, the Scalpel, or Bistoury, represented by ALBINUS in *Tab. I. Fig. 5.* is quite different from that used by the Author when I was at *Amsterdam*, and that represented here in *Tab. XXVII. Fig. 8.* which I had of his Instrument-maker, whose Name and Mark is there the *Blue Bell*, as may be seen in the *Figure*. I therefore cannot see any Reason for his altering the Knife, since that which ALBINUS has represented, is not at all preferable to the original one of the Author.

perform his Operation in *Holland*, as I have been informed by ALBINUS, both Father and Son, together with RUYSCH, (another of my Masters in Anatomy and Surgery) and as I have often understood from several other Physicians and Surgeons of *Amsterdam*; but he had also probably received an Account of the Emendations made in JAMES's Method by M. MERI, and the Account of MARESCHALL's Success before mentioned in Dr. LISTER's Book. Thus, being assisted with a chirurgical Audacity, and great Skill in Anatomy, he first, like JAMES and the Ancients, cut through the Perinæum, and then through the Neck^a and Bladder itself; which M. MERI assures us was the Method constantly first used by JAMES, and as I have often seen him perform it at *Amsterdam*^b. RAW also made use of the grooved Catheter to cut upon, which M. MERI had recommended^c; but, like JAMES, he had it made somewhat thicker than common. Then, instead of the *Gorgeret*, he used two ensiform Conductors, male and female, as in *Tab. XXVIII. Fig. 2 and 3*. But his Scalpel and Forceps were the same as in the common Method by the *Apparatus Major*: and the Posture in which he placed his Patients, was pretty much like that of JAMES^d, lying on their Backs with their Hips elevated. But then he secured them by Ligatures, in a Manner differing from the common Method, which has been rightly described by few, and is generally altogether neglected by those who have treated on his Method. Tho' I must needs think it a very necessary Part in the History of his Operation; and the more, as his Method of tying the Patient was not so terrifying as the common, which M. TOLET asserted to be the Occasion of great Fear in the Patient, and M. WINSLOW even instances Death brought on by the Fright. See his *Epist. in MORAND. Lib. de Alto Apparatu*. Therefore, instead of the long Bandages which others used to put about the Patient's Neck and Limbs in so formidable a Manner, RAW only applied two short and flat Ligatures made of Flannel, (though they may be also composed of Silk or Linen) each of which were not above four Feet long. The Patient being laid on the Table represented in *Tab. XXIX. Fig. 10*. his right Wrist was then fastened with one of the Ligatures by the Loop A to the Leg of the same Side, not at the Ankle, as was the Practice of others, but to the Knee. And the same Method was observed on the left Side. This Method of securing the Patient is so peculiar to RAW, that it has been general-

^a As is remarked by ALBINUS, the Father, in *Oratione in Obitu RAVII*, pag. 29. tho' the Son, and DIONIS will have it, that he only divided the Bladder itself, without touching its Neck.

^b When I at that Time, and afterwards often performed the Operation on dead Subjects, I always found, that I had divided, not only the Bladder, but also its Neck: but I then imagined myself in an Error, and supposed I did not know the Art of dividing the Bladder only.

^c The Reason of the Catheter being thicker, or of a large Diameter than the common, was, as RAW told me, that the Knife might the more readily pass into its Groove, and not easily slip out of it again; tho' I am ignorant whether he made the same Remark public in any Dissertation. Nor do I find upon a Comparison made, that it was more incurvated than the common Catheters, as ALBINUS relates: for in the *Apparatus Major* there is required, and constantly used a very crooked Catheter, or of a large Curvature; as GARENGEOT expresses it.

^d The Situation in which RAW disposed his Patients for the Operation, is perhaps better described by ERNDELIUS in his *Iter Anglicum & Batavum*, pag. 119, than in any other Author; from whence we also learn, that RAW sometimes placed his Patients on a little Box or Chest, when his proper Table was not at Hand. Therefore what GARENGEOT says in his *Surgery*, Tom. II. pag. 192. that RAW placed and bound his Patients in the same Manner as for the *Apparatus Major*, is not true.

ly attributed, not to MERI or MARESCHALL, but to him as the Author; and therefore it has been generally termed the RAVIAN Method of Lithomy: But from the Time of publishing the famous Dissertation of Dr. JAMES DOUGLAS upon the *Lateral Operation* at London in 1726, which was afterwards translated from the *English* into *Latin* at Leyden in 1728. I say, from that Time it has been denominated the *Lateral Operation*. Since that, the Method has been performed, amended, and described by Mr. CHESELDEN at London, who also calls it the *lateral Operation* or Incision for the Stone; because in that Method the Incision is made more on one Side of the Perinæum, and the Bladder is also incised laterally: whereas in the *Apparatus Major* the Incision is made in the Urethra only.

I was the
first that
performed
this Method
after RAW.

XIV. Before I proceed to acquaint you with the Emendations which have been made at Times in this Operation, I shall first remark a few Particulars relating to the Author of it, and his Manner of performing the same, according to my own Observation. Having finished the Course of my Studies in Germany, and being taken with the Fame of the celebrated Dutch Professors in Physic, I went next to Holland, and there stayed about five Years, to improve myself chiefly in Anatomy and Surgery, on which I had placed most of my Affections. For the first Part of that Time I resided at Amsterdam, continuing my Studies under RUYSCH and RAW: but towards the latter Part, I began to teach other young Students in Anatomy and Surgery; so that I had at the same Time not only an Opportunity of seeing RAW perform his Operation, but I had also the Privilege of imitating him, and demonstrating the same to others upon dead Subjects, since the public Professor and my Master RUYSCH had given me Liberty to dissect dead Bodies in the Hospital, when I should think proper, and apply them to chirurgical Uses. By this means I became at length so expert in the Knowledge and Performance of the Operation, that I could hardly doubt of succeeding if I made Trial on a living Patient. Now in the Year 1709, when Tournay was besieged by the united Provinces, I having been made Physician to the Camp, thro' the Recommendation of Professor RUYSCH in the Year 1707, I therefore at that Time attended the Hospital erected for the Sick and wounded at Oudenarde: where, among other Patients I met with a Lad of about fifteen Years old, afflicted with the Stone in his Bladder, whom I cut, and freed from a Stone, weighing two Ounces, by the RAVIAN, or lateral Method of Lithotomy, in the Presence of D. DE QUAURE, Surgeon in chief, with several others; and my Operation, which was performed in August, succeeded very happily. In the Year 1710 I was called to take up the Professor of Physic, Anatomy, and Surgery at Altorf. But I first went over to England, and endeavoured to improve myself by conferring with the most eminent Surgeons and Physicians at London, particularly CYPRIANUS, RUSSIÈRE, and LAVATÈRE: and towards the End of the same Year I returned to the University of Altorf. There, in the Year 1712, I cut a Lad of Seven Years old, by the RAVIAN Method of Lithotomy, as I had just before explained it in my Chirurgical Lectures and Demonstrations, and thereby extracted the Stone, in the Presence of a great Number of Students in Physic. The Operation being afterwards repeated many Times by me at Helmstadt, and elsewhere. From whence I think it appears, that I

was

was the first, as far as I can hear, who performed this Method of Lithotomy, after RAW, upon living Patients: which I had not only explained and demonstrated in my Chirurgical Lectures from the Year 1708, by performing the same frequently on dead Subjects; but I also gave the following short Description of the Operation in the first Edition of my Surgery, printed in the German Tongue at *Norimberg* in the Year 1718, in § XI. of the Chapter on Frere JAMES's Method of Lithotomy. In that Place, after shewing that the Method, as JAMES originally performed it, was very unsuccessful and despicable; I observe, that there were several judicious Surgeons and Physicians, who thought it might be more useful than the common Method in several respects, when executed by expert and knowing Hands, such as were skilled in the Anatomy of the Parts, and knew how to amend the Defects of the Operation, as it then stood: for, as it was, none of them would undertake to perform it on living Patients. I there conclude, by observing, that, in my Opinion, RAW seems to have been the Corrector of this Method. For he, as I have seen, used to follow the Method of JAMES, as to the Place of his Incision; but he exchanged the Instruments, and used a grooved Catheter to cut upon, afterwards introducing a male and female Conductor into the Bladder, in the same Manner as for the *Apparatus Major*: by which means the Operation happily succeeded with him. And, soon after, comparing this Method with the *Apparatus Major* in § XII. I observe that in JAMES's Method, as improved by RAW, it is difficult to make the Wound so deep as to cut into the Groove of the Catheter in the Bladder, without injuring the adjacent Parts, which would not be so much endangered in the *Apparatus Major*. Which Observation I find to have been since published by others, without mentioning my Name. And this was the brief Intimation which I thought sufficient at that Time to inform the Skilful, who might be desirous of trying and improving the Method which lay then in Silence and untouched by any body but myself. But as the Operation has been since so much esteemed and practised, and the Subject of many Dissertations, I have therefore now been much more particular in relating every thing concerning RAW, and his Method, to compleat the History of his Operation, more especially with regard to what has escaped others, and fallen under my own Cognizance.

XV. Besides the Observations which I have communicated at § XIII. foregoing, relating to his Instruments, &c. it may also not be amiss in this Place, to take notice of a few Particulars relating to the Life of this great Lithotomist. And, first, M. GARENGEOT asserts, that RAW obtained his Doctor's Degree through the Procurement of the Senate at *Amsterdam*, in Consideration of his great Skill and Merit in Surgery, in order to qualify him for the Professorship of Anatomy. But M. GARENGEOT appears to be in an Error with regard to this. For our Lithotomist had taken his Degree long before he performed any Operation at *Amsterdam*, even before his Name or Person were at all known in that City. He obtained his Doctor's Degree in the usual Manner at *Leyden*, after he had travelled from *France* thro' *Holland* to *Leyden* in the Year 1694; After this, as ALBINUS the younger observes, in the Life of our Lithotomist, he was harassed with an itinerant Life till he fixed his Seat at *Amsterdam*, where he first began to teach Physic and Anatomy to others, and particularly:

Other Observations relating to RAW.

Surgery ; which he practised with great Industry. It is not therefore true, that he had his Degree in the Method assigned by GARENGEOT. Nor is it true, that he, by the same Means, acquired the Professorship of Anatomy in the same City : For the Chair had been filled by RUYSCH above thirty Years before RAW was so much as known in *Amsterdam*. It is also well known, that RUYSCH executed that Office all the Time with great Assiduity and Applause, even till his own Death, which was a long Time after that of RAW : nor is it probable that a Man so well qualified and deserving as RUYSCH, should be displaced from his Professorship, without any manifest Cause, in order to confer it on a Stranger, whose Abilities were much inferior. I may also justly affirm, that RAW had not so much as the second Place to the Professorship of Anatomy at *Amsterdam* : but all that he taught was in private to Pupils at his own House, among whom I entered myself as one. It is also a just Observation of ALBINUS, that RAW applied himself more to the Practice of Surgery than Physic at *Amsterdam* ; for I am certain that he did not much care to be concerned in the Treatment of internal Disorders : and, to speak the Truth, he was not sufficiently qualified for that Business. Sometime after the Departure of JAMES from *Amsterdam*, in his Tour for *Paris*, RAW made a closer Application to Lithotomy than he had ever done before ; and, succeeding in an extraordinary Manner, he was at length honoured with the Title of the *States Lithotomist*. However, we must not forget to mention, that, in his Course of Operations, which he demonstrated to young Students, when he came to the Subject of *Lithotomy*, his Phrase was : “ That he had nothing to say upon that Head, because it was the Means by which he subsisted, and got his Living : and I had rather be silent, than propose any thing which might mislead you from the Truth. But, says he, if you can learn it by seeing me perform the Operation upon living Subjects, you are welcome, and for the rest you may read CELSUS.” This indeed was a Token of his Avarice, and seemed to me a kind of Mystery for a long Time : till at length I concluded that he cut upon the Catheter in that Part of the *Perinaeum*, which had been pointed out by CELSUS to be incised, upon the Stone without a Catheter. I remember that, while I was engaged with him, he had a Design to publish a Dissertation upon some Subjects, which had been neglected by other Surgeons, chiefly in the Eye and Ear : (for I believe he wanted either Application or Ability to engage in any larger Subjects,) in which he particularly describes a Process of the *Malleus*, called from him the *Processus Ravianus* ; which, he has declared to me and others, was accurately expressed in Copper-plates then in his own Custody. But I do not understand that he ever published this Treatise, nor any other, except the Oration at his Instalment into the Professorship of Anatomy and Surgery at *Leyden*, after the Death of BIDLOW. Lastly, I must not omit that M. DENYS, Surgeon and Lithotomist at *Leyden*, writes in the Preface and Introduction of his Treatise upon cutting for the Stone, that he had taken upon him to make the same publick to the World, that it might receive the Benefit of the Observations, which had occurred to him in the Practice of Lithotomy, as it had been performed by RAW, to whom he was an Assistant. Notwithstanding which, as I have once before observed, he does not speak a Word of the true Manner in which RAW used to cut his Patients ; which, as he tells us, was revealed to him just before the Death of his Master.

ster. But the whole Drift of his Discourse seems only to prove, that this Method of Lithotomy was better than the rest, that RAW was the Inventor of it, and that he himself continued to exercise it with Success.

XVI. The celebrated *English* Surgeon Mr. CHESELDEN (who had for some Time practised, after DOUGLAS, the high Operation, or *Apparatus Altus*, with wonderful Dexterity and Success) endeavoured to improve RAW's Lithotomy, by varying the Practice, and adding more convenient Instruments. But the very first to whom RAW's Method of Lithotomy owes any Improvement in *England*, was BAMBERY, who performed the Operation in the publick Hospital at *London*, as we are informed by DOUGLAS, in his History of the *Lateral Operation*: who there tells us, that he followed RAW's Method in every respect, except that he used previously to distend the Bladder with Water before the Operation, by which Means he cut and freed several Patients from the Stone, with Success equal to that of RAW. But it gives me no small Concern that DOUGLAS should not have informed us in what Manner the Water is to be conveyed into the Bladder, and retained there after the Extraction of the common Catheter and Introduction of the grooved Catheter; between which it is probable all the Water would in the interim be discharged: upon which account this Method of distending the Bladder with Water, seems to be of little or no Service. But Mr. CHESELDEN has in some measure changed RAW's Method of Lithotomy, and performs it in the following Manner.

CHESELDEN'S, OR
rather BAM-
BERY'S Im-
provement.

XVII. His Table, which is of a square Figure for holding the Patient, is higher at that End upon which the Patient is to be seated than at the other: the Length of the Table is about three Feet and an half, its Breadth about two and an half, and its Height from the Ground three Feet. The Patient being laid on his Back upon this Table, has a Pillow placed on his Head, and another under his Hips, so that his Abdomen lies lower than his Head and Hips. His Buttocks are then drawn a little beyond the Edge of the Table: the Knees are drawn from each other, and bent in a convenient Posture; and, lastly, the two Wrists are tied to each of the Angles. In this Posture the Patient is held by three Assistants; two of which secure the Legs and Feet, and the third holds down the Patient's two Shoulders so firmly, that he cannot move his Body, or withdraw it from the Hand of the Operator. Mr. CHESELDEN then passes a Steel grooved and cannulated Catheter^a thro' the Urethra into the Bladder after the usual Manner; and thereby injects a sufficient Quantity of Water to distend the Bladder moderately, without giving the Patient any great Uneasiness^b, much in the same Manner as in the high Operation. To prevent the Water from returning again out of the Bladder, he makes a Ligature of

Mr. CHE-
SELDEN'S
Method of
Operating.

^a It is to be wished that Mr. CHESELDEN had delineated this Catheter, since it is not easy to conceive, by his short Description, how the Catheter could be both grooved and cannulated at the same Time.

^b Which Quantity, he says, must be always judged of by the Patient's Pain or Uneasiness which it occasions, since the Variety of Bladders will not admit of the certain Quantity to be determined; but, as an Example, he tells us, that seven Ounces was the Quantity of Water injected into a young Man of eighteen Years old, who had a Stone weighing six Ounces.

Flannel upon the Penis, so as to compress it, the Catheter still remaining in the Bladder^a. After this he gives the Handle of the Catheter to be held by a prudent Assistant, not to press its Groove towards the Part to be incised, as is usual in the high Operation, and in RAW's Method, but only to take care that it does not slip out of the Bladder from the Causes we shall presently mention. This done, Mr. CHESELDEN places himself in a Chair, corresponding to the Height of the Table and Patient, so that he may perform the Operation sitting. He then makes an Incision with a round-edged Scalpel, beginning about an Inch above the Anus on the left Side of the Perinæum betwixt the Accelerator muscle of the Urethra and the Erector-penis in the Manner of JAMES and RAW, and descending obliquely downwards towards the Out-side of the Sphincter-muscle of the Anus, divides about the Space of two or three Fingers-Breadth, more or less according to the Patient's Age or Size: and this Incision he makes at once thro' the whole Skin, Fat, and Part of the Levator-muscle of the Anus, contrary to RAW, who divided the Parts by several Incisions. When he has done this, he introduces the Fore-finger of his left Hand into the Wound, and thereby presses the Rectum to the other Side, that it may not be injured by the Knife: then he takes another Scalpel of a falciform, or a crooked Figure in his right Hand, and passes the Point thereof by the Side of his left Fore-finger still remaining in the Wound, 'till it has pierced the Bladder^b between the *Os Ischium* and seminal Vesicle; and turning the Point of the Knife upwards, he continues to enlarge the Incision therewith, 'till it again comes out at the upper Part of the Wound where it entered. The Bladder being thus opened^c, he passes the Fore-finger of his Left hand into its Cavity, and thereby feeling the Stone, and holding it firm, he introduces a Pair of Forceps without any Conductor over his Finger, and therewith endeavours to lay hold of the Stone: which when done, he withdraws his Finger, and grasping the Forceps with both his Hands, he endeavours to extract it with more or less Force, in Proportion to the Size and Figure of the Stone, and Width of the Wound. If there should be more Stones than one, he again introduces his Fore-finger, and then the Forceps into the Bladder, and proceeds to extract them as before. During the whole Operation he always leaves the Catheter in the Urethra and Bladder; and the Assistant who holds it, does nothing more than prevent it from moving in, or falling out of the Urethra: and in this Manner Mr. CHESELDEN thinks the Bladder may be sufficiently divided for introducing the Forceps over his Finger without any Conductor. And as the Bladder is before filled with Water, it is neither necessary nor possible to cut through it into the Groove of the Catheter; nor is there any Danger of laying hold of the Catheter with the Forceps, if the Stone be in this Manner directed to it by the

^a But we are not told by DOUGLAS in what Manner Mr. CHESELDEN prevented the Water from escaping out of the Bladder thro' the Catheter: The Ligature will indeed prevent it from passing betwixt the Catheter and Urethra, but will not hinder it from coming through the Cavity of the Catheter; which therefore must be closed by another Ligature, the Finger, or some other Means.

^b I suppose he was certified that the Knife was in the Bladder by the Efflux of the injected Liquor: but of this DOUGLAS makes no mention.

^c I imagine he must also divide the Neck of the Bladder, tho' he does not mention it.

Fore-finger. In this Method only one or two small Arteries are divided, so that there is no great Danger of any Hæmorrhage ensuing, which seldom happens: but if, after the Wound has been cleansed with a wet Sponge, the Blood should continue to flow, those small Arteries which are divided, are then to be taken up with a crooked Needle and Thread, as represented in *Tab. XXXI. Fig. 14.* And the Wound being dressed with dry Lint, spread with some digestive Ointment, and secured with proper Compresses and Bandages, the Patient may then be put to Bed. In this Manner, if no extraordinary Impediment occurs, Mr. CHESELDEN performs the whole Operation in the space of one Minute, computing from the first Entrance of the Knife till after the Stone is extracted, as DOUGLAS informs us.

XVIII. In the mean time it is to be observed, that Mr. CHESELDEN is sometimes obliged to vary his Method of operating according to particular Circumstances. As when, 1. He has taken hold of the Stone, and in endeavouring to extract it, perceives, from its great Resistance and other Signs, that it is a very large one, rather than put the Patient to extreme Torture, by forcing it thro' and lacerating the Wound, he chuses to enlarge it by making a second Incision, either with a Scalpel or Scissars. 2. After the Incision is made, if he perceives the Catheter to be slipt into the Wound, as he passes his Finger thro' it into the Bladder, he withdraws his Finger, and passes^a a Conductor, or the Gorgeret in its stead, into the Groove of the Catheter, over which he again passes the Forceps in the usual Manner into the Bladder: and upon this Account, as the Accident may frequently happen, he generally prefers the grooved Catheter before the common one. 3. If the Assistant, who holds the Catheter, should perceive that it is taken hold of by the Forceps, either with or without the Stone (which is an Accident that Mr. CHESELDEN affirms not to be often met with) in that Case he orders the Catheter to be drawn out, and then tries to lay hold of, and extract the Stone, without that Advantage which the Catheter might otherwise afford, by pressing down the Bladder, for the more easy Admission of the Forceps over the Finger to the Stone in the Bladder. 4. When by reason of the Smallness, or Situation of the Stone, he thinks it may be more convenient to press it thro' that Wound, as in the *Apparatus Minor*, he then does it by introducing his Fingers into the Patient's Anus, without making use of any Forceps. 5. When he perceives any Resistance to the Stone in its Extraction; or if there is any Constriction of the Parts occasioned either by the Ureter, or Membranes, or uncommon Folds of the Bladder intercepting it, he then also introduces his Fingers into the Patient's Anus, and thereby endeavours to thrust the Stone to the Mouth of the Wound, where he divides the Membranes, or whatever else might obstruct its Exit; and thus the Stone being set at Liberty is easily extracted. From hence, says DOUGLAS, one may easily perceive, what Alteration and Correction has been made in RAW's Method of Lithotomy by the acute Mr. CHESELDEN: which ought to be the more regarded, as thereby he has happily cut and cured many, that have been

Some Accidents and Cautions.

^a Why the Conductor should in this Case be necessary, and the Finger not sufficient, as at other Times, I cannot comprehend.

violently afflicted with the Stone; insomuch that DOUGLAS^a tells us, that in the Time he then writ, there was not one Patient, who miscarried under his Hands. However, he advises one thing more, which he thinks necessary towards completing the Operation; and that is, to have the Forceps made a little crooked, which in some Cases has been used by Mr. CHESELDEN to much more Advantage than the straight ones. He says he has frequently observed, that the Stone may be extracted with much more Ease when it lies near the Wound, than in the opposite Side of the Bladder; especially if there should be some preternatural Sinus in that Part as it sometimes happens: in which Case the Stone may be more easily intercepted, and extracted by a Pair of crooked, than straight Forceps.

Another
Method of
Mr. CHE-
SELDEN'S.

XIX. But however commodious, easy, and safe this Method of Lithotomy might at first appear to DOUGLAS and CHESELDEN, we find that it was rejected soon after by the last; because it frequently occasioned, as he says, a fetid Ulcer in the *Cellular Membrane*, near the Rectum, by the Insinuation of the Urine: he therefore contrived and approved of the following Method: First, he tied the Patient as usual for the *Apparatus Major*; but laid him upon an even Table covered with several Clothes, and about three Feet from the Ground, only elevating his Head a little higher than the rest of his Body. After this he makes as large an Incision as the Parts will admit of, beginning in that Part of the Perinæum where the Incision of the *Apparatus Major* usually ends, and continuing the same downward between the Accelerator-muscle of the Urethra, and the Erector-penis on the left Side of the *Intestinum rectum*. He then searches for the Catheter in the Wound; and having found it, cuts through the prostate Gland straight forward into the Bladder, at the same Time pressing the Rectum to one Side with the Finger of his left Hand, to prevent it from being injured by the Knife. The remainder of the same Operation is performed in the same Manner as for the *Apparatus Major*; only if he has divided any large Blood-vessels, they are afterwards taken up with a Needle and Thread.

Explained
more at
large by
DOUGLAS.

XX. What has been briefly declared by Mr. CHESELDEN concerning this Method of operating, is exemplified more at large by DOUGLAS, in an *English* Treatise, entitled, *An Appendix to the History of the lateral Operation*, 4to, in the Year 1731. In the first Place he proceeds as in the *Apparatus Major* and lateral Operation: that is, he places the Patient upon the Table, and secures him in a proper Posture with Ligatures, as we mentioned before § XVI. after which he passes his Catheter (represented in *Tab. XXXI. Fig. 5.*) in the usual Manner into the Bladder of the Patient. But as soon as the Incision is made in the external Parts, as we before mentioned, he directs the Point of his Scalpel towards the Catheter; which differing from the common, is represented in *Tab. XXXI. Fig. 8.* With the Point of this he makes his Incision successively thro' the posterior Part or Bulb of the Urethra, through the Neck of the Bladder and prostate Gland, and Part of the Bladder itself, cutting through them in a right Line into the Groove of the concave Part in the Catheter, *Fig. 4. and 7.* See *Tab. XXIX. Fig. I K L.* Having thus made his Incision sufficiently large, he rises from his Chair, and passing the Fore-finger of his Left-hand into the Wound, gently dilates it for the Passage of a particular kind of Conductor

^a In his *Hist. of the Lateral Operation*, in *English*, p. 87.

resembling the *Gorgeret Tab. XXXI. Fig. 9.* but with a crooked Handle marked A A. The Point of this Instrument he passes into the Groove of the Catheter, that it may be held more securely in its Situation: having felt the Stone, he takes the crooked Handle of the Conductor in his left Hand, and, drawing out the Catheter, introduces his Forceps, *Fig. 11.* whose Structure at the Hinges is a little different from the common. These he passes with the smooth Side upward thro' the Groove of the Conductor into the Bladder: then he draws out the Conductor, and feeling the Stone with the End of the Forceps as yet shut, he opens them so as to intercept the Stone; and applying both his Hands to the Instrument, his left Hand to the Middle, and his right to the Extremity of its Handle, endeavours to extract the Stone gradually, that the Parts may dilate and give way. To promote which he gently turns round the Forceps, and moves it in all Directions, taking care at the same Time that the Stone does not slip out: but if it happens to slip, he endeavours to recover it without extracting the Forceps. If the Stone is large and smooth, being lodged in the Cavity of the Bladder near the Wound, he extracts it with great Ease from all Patients of whatever Age. But if he finds the Stone to be very small, or inconveniently situated, so that it cannot be intercepted by the Forceps, he extracts that Instrument, and introduces his Finger into the Bladder, in order to turn the Stone, and free it from the Wrinkles of the Bladder. He then passes his Conductor over his Finger, which he immediately withdraws, and turns the concave Part of the Conductor upward; thro' which he at last conveys his Forceps to intercept and extract the Stone as before, but very slowly and cautiously. Lastly, to prevent the Stone from breaking in its Extraction, he thrusts one or two of his Fingers betwixt the Cheeks of the Forceps, that they may not pinch the Stone too violently. But if it should break notwithstanding this Precaution, or if there are more Stones than one, he repeats the Operation of passing the Forceps with his Finger to intercept and extract each of them; which, when cautiously performed, he assures us is not attended with any Danger. He makes his external Incision in the same Part with JAMES and RAW; but he continues it much higher and lower, that his Instruments may meet with the more easy Passage into the Bladder, and the Stone by that Means be more readily extracted. But internally when he has divided Part of the Urethra, the Neck of the Bladder, and Part of its Body, if the Stone be large he continues the Incision, without injuring the Rectum, which is very liable to be wounded in the lateral Operation; and thus he commodiously extracts Stones of a very large Size. If any small Artery is divided, and bleeds excessively, he takes it up with a small crooked Needle and Thread when it lies superficially: but when it is deeply situated, so that he cannot come at it with a Needle, he endeavours to stop the Blood with a styptic Liquor. Having extracted the Stone, he then dresses the Wound with a digestive Ointment spread on Lint, and retained with a slight Bandage: then the Patient is conveyed to Bed, and the Lips of the Wound are brought together gradually by tightning the Bandage at each Dressing, which, after the first Time, is usually twice a Day. From hence, says DOUGLAS, it appears that this Method of CHESELDEN is composed partly of the *Apparatus Major*, and in Part of RAW's Method of Lithotomy; but in my Opinion it seems altogether to be RAW's.

Mr. CHE-
SELDEN'S
third Me-
thod.

XXI. We are farther to observe, that the ingenious and diligent Mr. CHESELDEN did not here stop short in his Researches and Experiments, but has endeavoured to make still farther Improvements in his Method of Lithotomy, chiefly with regard to his Incision internally; which he performs by directing the End of his Knife (after enlarging the external Wound, from the Scrotum to the left Side of the Anus, and raising the Catheter by the Help of an Assistant towards the Union of the *Ossa Pubis*) thro' the inferior and lateral Part of the Bladder above the seminal Vesicles, and behind the prostate Gland, till it had reached into the posterior Part of the Groove in the Catheter. See *Tab. XXIX. Fig. 5. L.* He then continued his Incision forwards thro' the Sphincter of the Bladder and left Side of the Prostate, into and through the membranous Part of the Urethra, till he arrived at its Bulb, represented by K I F much in the same Manner as is described in his first Method at § XVII. for by that Means he was surer to avoid injuring the Rectum, than in RAW's, and the preceding Methods. He also asserts, that, in the preceding Methods of cutting, the Groove of the Catheter cannot be so easily perceived and cut into thro' the Bulb of the Urethra: which DOUGLAS, in his forementioned *Appendix*, has declared more at large. M. MORAND proposes nothing concerning this Method, but declares that described at § XIX. to be the best. Lastly, among Mr. CHESELDEN's Emendations in Lithotomy, the following are also numbered by DOUGLAS. 1. That when he finds the Patient's Pulse to be very low after the Operation, he applies Blisters to his Arms, to raise his Spirits, which answers to good purpose. 2. When he perceives the Wound to grow callous, he introduces a bit of Blister-plaster, which erodes it, so that new and sound Flesh may afterwards sprout up, and close the Wound. 3. If the Wound is foul or putrid, he mixes a little Verdegrease with a digestive Ointment.

LE DRAN'S
Opinion and
Observa-
tions.

XXII. The celebrated M. LE DRAN of *Paris* has a *French* Treatise, intitled, *Parallele de différentes manieres de tirer la Pierre hors de la Vessie*, printed in 1730, in which he endeavours to deliver all the Methods of Lithotomy, that of CELSUS only excepted, which have been to this Day at any Time practised: and after making an accurate Examination into them, not only illustrates them with many Experiments upon dead Subjects; but also with great Industry remarks the Structure of the Parts to be divided, with the Advantage and Disadvantage to which each Method is liable. From whence he concludes, that one Method is only preferable to the other, according to the particular Circumstances of the Case; and therefore he advises every prudent Surgeon, who intends to cut for the Stone, to make himself well acquainted both with the Theory and Practice of all the Methods of Lithotomy, which may in any Case be practicable. In the mean Time he esteems the Method of cutting by the *Apparatus Major* to be preferable, on several Accounts, to the rest, if it be performed with Discretion, and particularly having a Regard to what has been said in § VII. and VIII. upon the *Apparatus Major* from the same Author, and chiefly to observe, that the Neck of the Bladder be sufficiently divided, and afterwards dilated gently with the Fore-finger and a Conductor: for by this Method it most commonly succeeds well, is performed with great Safety, and occasions less Pain than the Scalpel in the lateral Operation. But when it is done precipitately, as is the Practice of some, it occasions a grievous Lacera-
tion

tion of the Part, violent Pain, and other bad Symptoms, which might be avoided by using the Finger in this Manner. He therefore justly re-primands those Surgeons, who, out of a vain Desire of being thought more dextrous than the rest of their Brethren, endeavour to introduce the Forceps, and extract the Stone with uncommon Haste and great Violence; the Consequence of which may be Laceration, violent Inflammation, a Gangrene, and perhaps Convulsions, and Death itself.

XXIII. But the forementioned Author does not detract from the Merit of the *Apparatus Altus*, nor of the lateral Operation: but he endeavours chiefly to shew, that the Neck of the Bladder and prostate Gland are divided by the Knife in the lateral Operation, whereas they are gently dilated by the Finger in the *Apparatus Major*. He is of Opinion that the high Operation may be safely performed in such Cases where the Bladder is large, and may be sufficiently dilated, by distending it with Liquor; which he thinks may be reasonably conjectured, from the Patient's being able to contain a large Quantity of Urine in his Bladder, who has not been subject to the Stone for any considerable Time. But he judges this to be a pernicious Method for those, whose Bladders are small or callous, that it cannot be sufficiently distended; which is generally the Case with those, who have been a long Time subject to the Stone, and thereby compelled frequently to discharge their Urine. He thinks the lateral Operation of RAW and CHESELDEN preferable to the common Method, when the Stone is very large; as it then requires an Incision in the Body of the Bladder, which may be enlarged and dilated at Discretion, in Proportion to its Size. However, he objects to the Catheter of RAW, which is delineated by ALBINUS; though, to say the Truth, the Catheter of LE DRAN himself is much shorter than that of ALBINUS, which, he says, is unfit for dividing the Bladder, since it too easily and frequently slips out of it: and therefore he presents the Reader with the Finger of another Catheter, which he judges to be more suitable for this Purpose. See *Tab. XXXI. Fig. 17.* which is perforated for some Space after a long Aperture marked *e. e.* by means of which the Neck of the Bladder may be compendiously incised, and an Opening made sufficient for the Admission of the Gorgeret, the Forceps, and Extraction of the Stone. Besides this, the Figure of his Knife is represented to us, differing from the common, chiefly at its Point, where it is sharper, *Fig. 16.* which he thinks may be also advantageously used to cut for the Stone, according to the Method both of RAW and CHESELDEN.

His Opinion
on the other
Methods.

XXIV. But such a bad Opinion has M. LE DRAN of the *Apparatus Minor*, that he thinks it ought not to be ranked among the other Methods, but rejected as pernicious, except it be for removing the Stone in the Urethra, or extracting it from the Neck of the Bladder. However, if we consider that the Wound in this Method is made in the same Parts, as in the lateral Operation through the Neck and Body of the Bladder, and that those two Methods differ only with regard to the Instruments, in the Opinion of myself and others^a; it will from thence follow, that the *Apparatus Minor* is an Improvement of the old Method, and is therefore not without its Advantages. 2. It has been the

His Opinion
of the *Apparatus Minor*.

^a Particularly M. WINSLOW, MORAND, FALCONET, &c.

only Method in Practice for these XVI. Centuries past, and has been not only exercised with Success during that Space, but was in the last Century, and is at this Day successfully used in several Parts of *Europe*^a; notwithstanding the *Apparatus Major* is sufficiently known in all Parts. 3. Experience testifies, that it is now daily performed with the desirous Success, especially upon Children and Infants, not only by itinerant Practitioners, but also by MARINUS^b, myself, and many expert Surgeons among the *Italians*. 4. Even in young Men and Boys under fourteen Years of Age, also in Adults, and Men of small Stature this Method of operating may be very well performed^c, as we are sensible of no material Objection, except the Stone should have a rough Surface. 5. Another Recommendation is, that it is practicable with the fewest Instruments, even with nothing more than the Knife: and Simplicity in chirurgical Operations is always a great Recommendation in their Behalf for Practice. We therefore think, that the *Apparatus Minor* ought rather to be retained, and farther improved: and I would strenuously advise, with ÆGINETA and ALBUCASIS, that the Incision be made thro' the same Parts as in the lateral Operation. In Adults, and those who are advanced in Years, it must indeed be confessed, that this Operation is not so suitable; and therefore CELSUS advises it only to Children and Lads under fourteen Years, excluding those from it, who are adult: though even in those it may be sometimes performed with Success, when the several Circumstances are duly considered, as M. MORAND alledges in *Mem. Acad. Reg.* 1731.

GAREN-
GEOT on the
lateral Me-
thod of cut-
ting.

XXV. M. GARENGEOT, in the first Edition of his Chirurgical Operations, has not said a Word concerning the high Operation, nor of the lateral Method of cutting for the Stone, as if he knew not that there was any such Thing in Being, or in Print. He has, however, in the second Edition of the same Book, inserted the lateral Method of Lithotomy, and extolled it above all others, since he finds it has been the Subject of so many Dissertations both in *England* and *Germany*; tho' he never once made trial of the Operation himself upon a living Subject: but, after his usual Manner, he does not fail to attribute the Honour both of the Invention and Improvement of this Method to his own Country only. When at the same Time the Method had been treated of, before the first Edition of his Book, by a great Number of Authors, as ALBINUS, DOUGLAS, CHESELDEN, BUSSIÈRE, LISTER, LAUNAY, SAVIARD, ERNDEL, FEHRIUS, and myself. But I hope it is sufficiently apparent, that both the *German* and the *English* Surgeons deserve to be allowed a Share in this Advancement of Lithotomy: for tho' MERY and MARESCHALL were the first

^a There have frequently been *English* Surgeons and Physicians in *Germany*, who have talked of the Operation on the Gripe, or cutting on the Gripe, as a very common Practice. And DOUGLAS, in his Lithotomy, tells us, that he continues to cut small sized Men by that Method: and the *Italians* still continue the same Practice. In *France* this Method was in the last Century performed with Success at *Paris*, and elsewhere by the famous RAOUX. The *Apparatus Minor* was also countenanced by TOLET in the last Century; and SAVIARD, a very late Writer in Surgery at *Paris*, tells us in his *Obs.* 86. that he performed this Method on a Girl. To these we may add M. DIONIS in his Surgery, pag. 182. And MORAND, in *Mem. Acad. Reg. Paris.* 1731.

^b See his *Italian* Treatise concerning the more principal and difficult Operations in Surgery.

^c M. MORAND in *Mem. Acad.* now cited, asserts the Method to be practicable in all Adults without Distinction.

(according to Dr. LISTER's Account) who hinted at improving JAMES's Method of Lithotomy; yet we find that both they and the rest of the *French* Surgeons deserted the Method soon after, and rejected it as both useless and pernicious. But the Honour of restoring this Method to Practice, after it had been rejected by the *French*, is due to RAW, who is the first that attempted to reform and practise it on living Subjects, and persisted in the same Method with Improvements, as long as he lived. Next to RAW, myself was the first Person, and then M. DENYS, who practised it in *Holland*, till at length it was received and improved by the *English* Surgeons, who have shewn a great deal of Merit herein. So that, if it had not been for others, the Operation would probably have lain for ever neglected and forgot among the *French*; and M. GARENGEOT himself would have been perpetually ignorant of it. The Method being thus improved and practised with Success in the Hands of other, while it had lain neglected by the *French* for the space of thirty Years, till afterwards many Dissertations published on the Subject had made it very remarkable and famous in the learned World; at length the *French* began also to embrace it. In order to which M. MORAND put on a laudable Condescension to travel into *England* in the Year 1729, to see, and be present with Mr. CHESELDEN in his Operations, contrary to GARENGEOT, and others of the *French* Surgeons, who were persuaded, that there was nothing to be learned out of *France*^a. When M. MORAND had learned what he could of M. CHESELDEN, he then returned to *Paris*^b, where he performed the Operation with Success upon several Patients, as we shall presently relate more at large. During M. MORAND's Absence, several of the *French* Surgeons, and particularly M. GARENGEOT, and PERCHET, Surgeon to the Hospital *La Charité*, made trial of the Operation upon dead Subjects, according to the Direction of ALBINUS and CHESELDEN. And when PERCHET had by this Means rendered himself sufficiently perfect, he performed the same with Success upon a Lad, and was the first, according to GARENGEOT^c, who happily performed this Method after JAMES at *Paris*, where he performed his Operation in the following Manner:

XXVI. The Patient being prepared, and the Day appointed for the Operation, the Surgeon should first order a Clyster to be administered, before he proceeds to his Work. After which the Patient is to be secured with Ligatures, as in the *Apparatus Major*, and placed upon a Table about two Feet from the Ground opposite to a good Light: a Pillow is then to be placed under his Hips, and another under his Head. The Patient being tied, his two Legs are to be held fast by two Assistants, and a third Person is to hold down his Shoulders, in such a Manner that he cannot stir himself any way; which is highly necessary for the safe Performance of this Operation. In the next Place a discreet Person is to be placed on the left Side of the Patient, in order to hold up the Scrotum, extend the Skin, and retain the grooved Catheter in the right

GAREN-
GEOT on the
lateral Me-
thod of cut-
ting.

^a The same proud Opinion seems to be also entertained by the Author of the Preface to COLOT's Lithotomy, pag. 80. & seq.

^b See Memor. Acad. Reg. *Paris* 1731. and GARENGEOT's Chirurgical Operations, Chap. on the Lateral Operation.

^c In his Surgery, Chap. on the lateral Operation.

Position in which it was placed in the Bladder by the Surgeon: and this is done in Imitation of Mr. CHESELDEN; that the Lithotomist, having both his Hands at Liberty, may more commodiously go thro' his Operation. Then a Steel Catheter made very crooked with a deep Groove, and long Beak, and a broad Handle, being first dipt in Oil, is past thro' the Urethra into the Patient's Bladder: in which being entered, the Lithotomist gently inclines its Handle with his left Hand towards the right Inguen of the Patient, and at the same Time searches between the Suture of the Perinæum, and Tubercle of the Ischium with his right Fore-finger, in order to feel the Beak of the Catheter through the Integuments, and to prevent it from touching the Ischium. The Handle of the Catheter thus disposed, is then held by an Assistant in his right Hand, in such a Manner, that his Thumb lies upon the upper Part of the Handle, and his Fingers below, taking care that it does not by any means stir or move out of its Place; while, with his left Hand, he elevates the Scrotum, and inclines it towards the right Side, in order to extend the Skin of the Perinæum. Then the Lithotomist, applying his left Fore-finger to the Suture of the Perinæum, presses it obliquely towards the right Thigh, and holding the Knife in his right Hand, first divides obliquely thro' the Skin and Fat; beginning about an Inch on one Side of the Suture of the Perinæum, and about a Line above the most prominent Part of the Beak of the Catheter, and extending it obliquely^a down to the Tubercle of the Ischium, in the Manner of RAW, who made his Incision from above downwards, tho' JAMES made his Incision from below upwards. With regard to the Depth of the Incision it is to be observed, that in lean Patients it may be done at once: but in those who are fat and more robust, it may require two or three Strokes with the Knife, more or less according to the Judgment and Dexterity of the Surgeon. This done, the Lithotomist then passes his left Fore-finger thro' the Wound; not to press the Rectum on one Side, to prevent it from being injured in the Manner of M. CHESELDEN, but to find and observe the Groove of the Catheter; that, if it be displaced, it may be again rightly disposed. For the Rectum is in no Danger of being injured by the Knife, when the Incision is performed according to the preceeding Direction: nor is there any Difficulty of searching for the Groove of the Catheter. Then to make the second Incision the Lithotomist requires each of the Assistants to hold the Patient firm, while he passes the Knife first thro' the Urethra, directing its Point into the Groove of the Catheter, over the Nail of his left Fore-finger: then he proceeds to divide the Neck of the Bladder laterally. And lastly, by elevating the Knife, so that the Back of its Point may be kept within the Groove of the Catheter, and its Edge towards the Body of the Bladder itself, he opens it for about a Finger's Breadth or more; in which Procedure consists the chief Advantage of this Method: but then the Fore-finger

^a There are indeed some who endeavour to give out, that RAW performed his external Incision in a right Line; from whence they infer, that he did not cut obliquely, but committed many Errors. But I have myself often seen him cut in an oblique Direction, as ÆGINETA had long before described in *Lib. VI. Cap. 60.* tho' that oblique Incision is in itself straight, and not lunar, as CÆLIUS directs. But then the Incision was oblique with regard to the Parts, as ALBINUS rightly observes, and made from above downwards, or towards the Tubercle of the Ischium to avoid the Rectum. But then this is obliquely: for a right Line may be, comparatively, either direct and parallel, or transverse and oblique.

should follow the Knife, as it divides the Parts, lest it should slip out of the Groove in the Catheter. The Incision being thus made sufficiently large, so that the Groove of the Catheter is laid bare for about two Fingers Breadth, the Knife is then withdrawn, the Fore-finger still remaining in the Groove of the Catheter: a Conductor is then conveyed by the right Hand of the Lithotomist by the Side of his left Fore-finger, by the Nail of which the Point of that Instrument is directed into the Groove of the Catheter. In the next Place, the Surgeon withdraws his left Fore-finger, and with the same Hand takes hold of the Handle of the Catheter, which had been till then held by the Assistant; and inclining it a little towards himself at the same Time, protrudes the Conductor, whose Point is in the Groove of the Catheter, into the Cavity of the Bladder: which may be judged to be rightly performed, when the Urine runs out both thro' the Instrument and the Wound. This done, the Surgeon then gently extracts the Catheter, by moving it a little from one Side to the other. Then he takes the Handle of the Conductor into his left Hand, and passes his right Fore-finger thro' its Channel into the Bladder, thereby gently dilating the Wound, for the more easy Admission of the Forceps; which are next conveyed with his right Hand thro' the Cavity of the Conductor into the Bladder. After which, with his left Hand he extracts the Conductor, and strongly opens the Forceps, to make a further Dilatation of the Wound, then shutting them again, he searches for the Stone, which being intercepted by the Forceps, is extracted by them, as we before directed. The Stone being extracted, the Fore-finger is then past into the Bladder, to search if there be any other yet remaining: if so, the Forceps are again introduced over the Finger to the Stone, and its Extraction performed like the former. Thus you have the Directions for performing Lithotomy according to M. GARENGEOT, who has endeavoured to illustrate the same by Figures: which are however so badly adapted and expressed, that myself and many others are altogether ignorant of their Meaning. Lastly, we must not omit his great Admonition, agreeable to DOUGLAS, in Opposition to ALBINUS junior, that the Bladder alone cannot be incised by this Method, without dividing at the same Time both its Neck and the prostate Gland laterally, with a very small Portion of the Bladder, as MORAND observes. There is also a small Knife exhibited by him, for this Purpose, which we have represented in *Tab. XXX. Fig. 15*, from Mr. CHESELDEN.

XXVII. It will not be foreign to our Purpose in this Place, to take notice of the several Improvements in the lateral Method of Lithotomy, which have come under my own Observation, either by reading or conversing with other Surgeons in *Germany*, which I shall therefore communicate for the public Good. But in this Place I shall only propose what has been done in this Matter by SENFFIUS, Surgeon to the King at *Berlin*, at which Place he was also Surgeon to the splendid and Royal Hospital of Charity, also Professor and expert Demonstrator of Chirurgical Operations; but is now, to the great Disadvantage of Surgery, deceased. However, I shall here relate the Manner in which he frequently performed the lateral Operation with Success: and this I shall do from the Account given me by my own Son, who resided a great Part of the Year 1735 and 1736 at *Berlin*, under the Tuition of that celebrated Professor whom he

Lateral Operation of
SENFFIUS.

has seen perform that Operation with great Dexterity, both upon dead and living Subjects. This great Man, who was admirably well skilled in all the Operations of Surgery, as well as that of Lithotomy, judged that the Method of cutting by the lateral Operation was preferable to all others, with which we are at this Day acquainted, and used to perform the same in the following Manner: First, the Patient was placed upon a Table about Knee-high and under him were placed two Pillows, one at his Head, and the other under his Hips, which last was then placed over the Edge of the Table, opposite to the Light; and his Legs being bent and secured with Ligatures in the usual Manner, were held firm by two Assistants, (which he omits in Children.) A third Assistant is placed to hold down his Shoulders: a Fourth kneels down upon the Table over the Patient, in the Manner represented in *Tab. XXIX. Fig. 9. D.* who with his right Hand draws up the Patient's Genitals, and with his two Fore-fingers extends the Skin of the Perinæum, by which means the Incision may be made more accurately, and the Catheter may be more sensibly perceived. Lastly, a fifth Assistant is placed on the left Side of the Patient, to hold and deliver the Instruments. All things being thus ready, our Lithotomist introduces a grooved Catheter made of Silver, very slender, and more crooked than usual, as represented in *Tab. XXVII. Fig. 15 a a a*, which being first dipt in Oil, and passed into the Bladder, he therewith searches for the Stone, and convinces the By-standers of its Existence. This done, he kneels down upon his right Knee, in the Manner of RAW, and with his left Hand turns the Handle of the Catheter towards the right Inguen and its Beak towards the Tubercle of the Ischium, in which Position it is held as before: then he cuts through the Integuments between the Anus and Tubercle of the Ischium in an oblique Direction, with a broad Knife not unlike that commonly used in Lithotomy, being in the same Manner invested with a Slip of Linen. Having made his Incision, he claps the Knife into his Mouth, and passes his right Fore-finger into the Wound, to feel for the Catheter; which, when found, he takes its Knife, and cuts into the Groove of that Instrument in the Manner of RAW. Then holding the Knife firm in the Groove, he, with his left Hand, presses the Handle of the Catheter a little towards himself, and, holding the Knife in his right Hand, the Edge of it follows the Beak of the Catheter as it moves inward, by which means it farther divides the Bladder, and enlarges the Incision. Then he delivers the Catheter to be held in that Position by the fourth Assistant; while he himself, with his left Hand, passes a male Conductor by the Side of the Knife into the Bladder: after which the Knife is extracted, and another female Conductor, made of Silver like the former, is introduced by the preceeding in the usual Method. Then having drawn out the Catheter, he, in the next Place, passes a Pair of Forceps between the Conductors into the Bladder; and extracting the Conductors, he searches for the Stone with the said Forceps, and extracts the same with so much Dexterity, that he is hardly longer than two or three Minutes about the whole Operation. As for what Parts he cuts through internally, I cannot certainly determine, having never had the Opportunity of examining the Parts after him. But he has declared himself, that he only divides the Bladder, which ought only to be done in performing the lateral Operation, after the Manner of RAW, as appears from what has been writ by ALBINUS and myself

myself concerning that Lithotomist. From which Writing SENFFIUS seems chiefly to have learned his Method of cutting, which agrees in every respect, excepting that his Catheter was more slender and crooked, being made of Silver instead of Steel. His Reason for having it made slender was, that it might pass more easily into the Bladder, preferring Silver on the account of its Neatness. And by making it more crooked than the common, he could thereby press the Urethra and Neck of the Bladder more outward towards the Perinæum: which makes me think that he divided not only the Bladder, but also its Neck.

XXVIII. In the last Place, M. MORAND, one of the most considerable Surgeons at *Paris*, and Member of the Royal Academy, reasons very prudently concerning the several Methods of Lithotomy; and concludes, that all of them may be used by a prudent Surgeon, as the Circumstances of his Patient require. He rather thinks the Multiplicity of Methods an Advantage, than an Incumbrance, if we regard particular Patients, and the different Circumstances of their Cases. Therefore no one Method is to be despised or rejected, which has Reason and Experience to vindicate it. And he asserts, that all the Methods have been duly examined and performed by himself. But after he had published a Dissertation in the Year 1728, concerning the high Operation, he there informs us, that he also designed to describe the lateral Operation. But when he heard with what great Success and Applause, Mr. CHESELDEN had anticipated him in that Design, his Inclination led him to be an Eye-witness of the Method of Practice used by that Surgeon. In order to which he came to *London* in the Year 1729, and not only made a strict Examination into the Method in which Mr. CHESELDEN cut his Patients, but had often Conversations with him upon the same Subject, and continued a Correspondence with him after he had returned to *Paris*, where he performed the Operation first upon a great Number of dead Subjects, till he had found himself absolutely perfect in every respect. He also tells us, that Mr. CHESELDEN had relinquished the high Operation, which he had till then performed so successfully, with no other View than to try, if he could not improve RAW's Method, so as to render it preferable to the high Operation itself. He afterwards relates the Experiments made by Mr. CHESELDEN, partly in Imitation of M. RAW's Method, as described by ALBINUS, and partly by a previous Distension of the Bladder with Water: but he alledges, that by both these Methods the ^a Urine frequently insinuated into the cellular Substance of the *Membrana adiposa*, which invests the Rectum, so as to occasion foul and putrid Ulcers, of which several Patients had died. He also further advises from Mr. CHESELDEN, that the Assistant who holds the Catheter, should not by any means press it outward, because in that Manner it may be easy to divide the whole Sphincter of the Bladder: nor should the Wound be made too deep in the *Membrana adiposa* near the Rectum, lest the Urine should stagnate and putrify there. We may also add, that when the Bladder is ulcerated, it may be more commodiously cleansed in this Method, than by any other: and, lastly, what is a great Recommendation

MORAND'S
Lithotomy.

^a I never knew any Accident of this Kind in RAW's Operations; nor did it ever happen to me when I practised in this Method.

to this Method of Lithotomy is, that a large Stone, which another Surgeon could not extract by MARIANUS's Method, Mr. CHESELDEN being present, and enlarging the Wound according to his Method, thereby extracted the Stone with great Ease. After many Experiments made in the Presence of M. MARESCHALL, late Surgeon in chief to the *French King*, in Company with many other Physicians and Surgeons, this Method of Lithotomy appeared to succeed very well at *Paris* 1730, according to the Relation of M. MORAND; so that out of sixteen Patients, eight of which were cut by PERCHET, and the other eight by MORAND himself, there was but one of them miscarried: whereas, on the contrary, out of twelve, who had been cut at the same Time, and in the same Hospital by the *Apparatus Major*, no less than five of them were lost. Among the Advantages of this Method we may reckon, with MORAND, that it is more easily and effectually to be performed than the Method of MARIANUS; inasmuch as the Fore-finger proves a certain Guide to the Operator, so that no Danger can attend the Patient. To which we may add, that the Operation in this Way is shorter and less painful than that of MARIANUS, so as to admit the Extraction of very large Stones without much Difficulty. Lastly, he pronounces RAW's Method, as it is described by ALBINUS, too intricate and difficult; and therefore doubts with DOUGLAS, GARENGEOT, and FALCONET, whether ever RAW actually cut his Patients in that Manner: and then M. MORAND concludes by promising to give a more perfect Account of the Method of performing the lateral Operation than we are at present furnished with.

Disadvantages of the Lateral Method.

XXIX. Notwithstanding the Encomiums which the *lateral* Method has at this Day acquired, there are yet several Difficulties and Inconveniencies to which this Method is equally liable with the *Apparatus Major*. As (1.) a *Fistula in Perinæo*. (2.) A transverse Position of an oblong Stone of a large Size, whose Figure cannot be certainly known before the Operation is performed, and to extract which the Operator frequently puts the Patient to extreme Torture, without effecting any thing: which may at the same Time be easily performed by the high Operation, or by the *Apparatus Minor*. (3.) The Stone's being situated above the *Os Pubis* in the Form of an Arch, and fastened to the Bladder, in such a Manner that it cannot be separated without endangering the Patient's Life; an Instance of which has been remarked by SERMESIUS and myself^a. (4.) When the Stone is very small, and lodged in some Cell in the Bladder, or is broke in pieces, which render it very difficult to be extracted by this Method, and is a Difficulty that has been met with both by RAW and SERMESIUS^b. (5.) This Method is not practicable when the Catheter cannot be passed into the Bladder by reason of some Obstacle. (6.) The Bladder is liable to be injured, pinched, or punctured by the Instruments: which Difficulties and Inconveniencies, with many others of bad Consequence, the learned and experienced SAVIARD, who cut such Numbers of Patients, found often in his Practice; and declares them to be as dangerous in the *lateral* Method as in the *Apparatus Major*. (7.) The lateral Operation is hardly practicable in Women, especially Adults, without great Ha-

^a See the Preface to DOUGLAS's Lithotomy.

^b Small Stones and Fragments are ever acknowledged by M. DENYS to be very difficultly extracted by the Lateral Method.

zard of wounding their *Vagina*, nor have we any Instance of the Operation succeeding in them : unhappy Instances of the contrary, we have indeed several, in the Practice of JAMES before taken notice of ^a. See also SERMESIUS upon this Head, *pag.* 182. who performed this Operation upon many dead Subjects of that Sex ; but in none of them without wounding the *Vagina* : and therefore upon this and several other Accounts the high Operation is in many Cases preferable to the lateral.

XXX. After all, it appears that the Operation of Lithotomy is precarious and dangerous, or its Event at least very doubtful, notwithstanding all the Improvements which have been lately made on it by several celebrated Physicians and Surgeons : nor is there any one Method to be relied on alone, but all of them are practicable to more or less Advantage, according to the particular Circumstances of the Patient's Case. Therefore a prudent Surgeon ought to be well acquainted with the Manner of performing all the Methods.

Lithotomy
a hazardous
Operation.

XXXI. The *Apparatus Minor* does not well succeed when the Stone is full of Prickles ; nor when it is so large as not to be conveniently held by the Fingers : nor does it succeed well in very tall Patients, because in them the Bladder is so far distant from the Anus, that the Stone cannot be felt, and thrust towards the Perinæum ; in which Case I judge the lateral, or the high Method more convenient. On the contrary, in Children, and small adult Patients, where the Stone is not very large nor prickly, and where it may be easily thrust to the Perinæum, we must needs think the old Method of cutting by the *Apparatus Minor* to be most eligible, as it is very simple, and performed by few Instruments ; (notwithstanding what others say in Opposition to it) and particularly when the Stone is fixt in the Neck of the Bladder, it is then the most convenient and proper of all others. The high Operation, we are assured by Experience, to be very dangerous in old and weak Patients, whose Strength is exhausted, and their Bladder ulcerated, as we have before observed § XXI. Whereas, on the contrary, it succeeds very happily in Children and young Men, tho' the Stone be very large ; as it does also when the Stone is very small, so that it can hardly be found by other Methods : and when there are several small Stones, or Fragments, each of them may be commodiously extracted by this Method ; but you must be very careful not to wound the Bladder. Though the Incision may be more easily performed, and with less Danger in the *Apparatus Major*, than in the lateral and high Operation, as in the first the Urethra only is wounded ; yet we cannot judge that Method to be useful, or even practicable, except when the Stone is small and of a smooth Surface : but when it is large and rough, there is Danger of a violent Extension, Laceration, and Contusion of the Neck of the Bladder. But if the Bladder be ulcerated, and the Stone not very large or rough, I then think it preferable to the high Operation ; as the Bladder may be better cleansed by an opening in its lower, than upper Part. As for JAMES's lateral Operation, as it stands improved by MERIE, RAW, and CHESELDEN, it excels the *Apparatus Major*, as being practicable in less Time, and may be used for extracting very large Stones : but as the Wound is made in the Bladder itself, and penetrates much deeper than in the Method of MARIA-

Cautions for
chusing the
Method.

^a RAW mentions one Woman that he cut in this Method ; but I remember no other Instance.

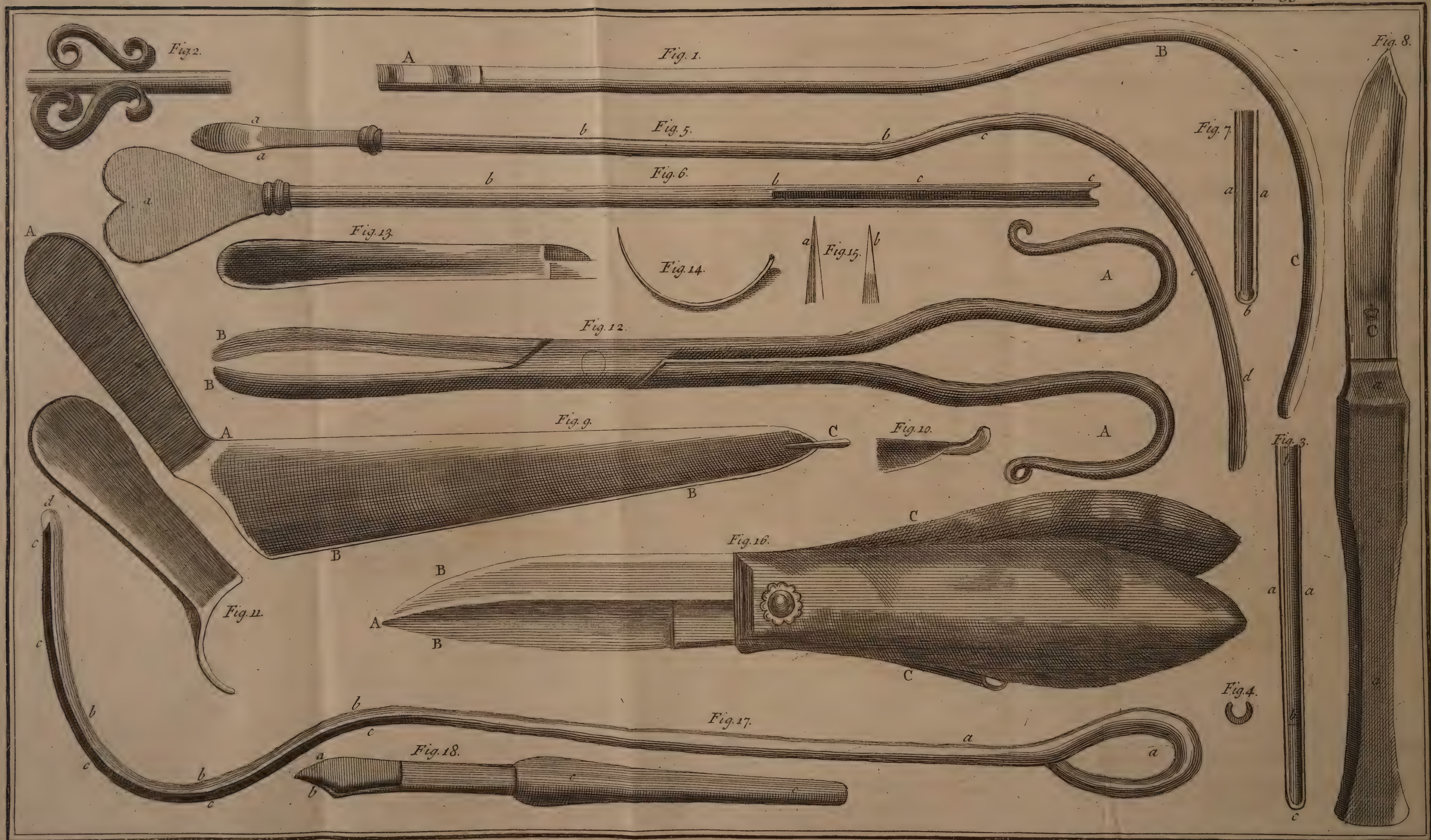
nus, in which the Urethra only is divided in the Perinæum, I must therefore think it more difficult and dangerous. For as the Incision is to be made very deep through the Parts which invest the Bladder, there is great Danger of the Knife's slipping out of the Groove of the Catheter, (especially in fat Subjects) so as to endanger a Wound of the Rectum, seminal Vesicles, and other adjacent Parts, or even the Bladder itself, as frequently happened to JAMES^a. The *Apparatus Major* is a dangerous and difficult Operation, as a large or even middle-sized Stone, if rough, cannot be extracted without a violent Extension, and perhaps a Laceration of the Neck of the Bladder. For when the Neck of the Bladder and prostate Gland, with the Sphincter and Urethra, are forcibly distended, or lacerated by a large or rough Stone, there is great Danger of a profuse Hæmorrhage, violent Inflammation, and incipient Mortification, if not a Cancer in the Bladder itself, or immediate Death; at least an Incontinency of Urine, or a Fistula in Perinæo, attended with other unhappy Consequences. So that it is hence apparent, that one Method is preferable to the other, only as it is more or less adapted to the particular Case of the Patient. In the Method of MARIANUS, and in that only, the Bladder is not wounded in cutting for the Stone: In that Method the Urethra only is divided; whereas in all others, the Bladder itself, and even its Body, is incised. In the high Operation the inferior and anterior Part of the Bladder is divided: but in the *Apparatus Minor* and lateral Method of cutting, the Bladder is incised in its inferior and lateral Part; so that these three Methods differ more in their Instruments, than in the Places of Incision, which are pretty near each other.

The Stone
sometimes
returns.

XXXII. Lastly, it is to be observed that Patients, who have been once happily cut and freed from the Stone by any Method, are notwithstanding frequently troubled with the same Disorder again. Thus I remember a Lad, who had been three times cut and freed from the Stone by RAW: and, to instance one Case out of many, a certain Merchant near *Norimberg*, was obliged to be cut four times, a new Stone being formed every Year, notwithstanding he was constantly under the Care and Treatment of a prudent Surgeon. In like Manner M. DENYS^b mentions a Man that was five Times cut for the Stone, a very large one being extracted at each Operation. But People should be careful not rashly to attribute this Relapse either to the Imprudence or Ignorance of the Lithotomist, as it is sometimes maliciously reported to the Damage of his Reputation: for it is in the Power of no Physician to prevent the Patient from ever relapsing into the same Disorder, though he may make a perfect Cure of him for the present. If the original Cause of the Stone still continues in the Patient's Habit, especially a bad State of the Kidneys and Bladder, it will in Time again produce the same Consequence or Disorder; which will again make it necessary to repeat the Operation, if the Patient is desirous of being freed from his Complaint.

^a Though the *Vesiculæ seminales* may be, and very often are, wounded both in the *Apparatus Minor*, and in the *Lateral* Operation, as LE DRAN and others have observed; yet it is not generally attended with any bad Consequence, as the Parts readily heal up with the rest that are divided.

^b *Chirurg. Obs.* p. 24.



An EXPLANATION of the THIRTY-FIRST PLATE.

- Fig. 1.* Represents a lateral View of RAW's grooved Catheter, as it is delineated in its true Figure and Thickness by ALBINUS. But it is to be observed that, in the Years 1706 and 1707, when I was his Pupil, he used a common grooved Catheter, like that represented in *Tab. XXVII*: only it was a little thicker than the common ones. A denotes a lateral View of its Handle. B the Part which ALBINUS asserts to be more crooked than the common ones; though in my Opinion it seems to be less crooked than those which have been figured, for the *Apparatus Major*, by TOLET, ALGHISH, GARENGEOT, LE DRAN, myself, and others. C denotes the Beak of the Catheter, which is longer and straighter than the common.
- Fig. 2.* Exhibits a flat View of the Handle of this Catheter, which may as well be made in the Form of a Heart like that of the common one in *Tab. XXVII*. or else flat and solid, as that of Mr. CHESELDEN in *Fig. 6. Tab. XXXI*. or with a Ring like that of M. LE DRAN in *Fig. 17. aa* of this Table.
- Fig. 3.* Represents the Beak of the grooved Part of RAW's Catheter, in which may be seen its thin, but smooth and obtuse Sides marked *aa*. betwixt which is the large Groove marked *bb*. C is the Termination of the Groove, in a smooth and obtuse Point.
- Fig. 4.* Is a transverse Section of the grooved Part of this Catheter, to shew its Form and Depth, that the Knife may not easily slip out of it.
- Fig. 5.* Exhibits the grooved Catheter of Mr. CHESELDEN, which is more slender, and less crooked than that of RAW's and the common ones: *aa* denote the Edge of its Handle in the Shape of a Heart: *bb* the Body of it in a rectilinear Form: *cc* the Curve and grooved Part: *d* the Beak of the Instrument, which has little or no Incurvation. DOUGLAS calls it the Rostrum or Beak which is strait.
- Fig. 6.* Represents the flat side of the Handle (*a*) of this Catheter, with Part of its Groove (*cc*) and its whole Body (*bb*).
- Fig. 7.* Denotes the strait Beak of the Groove in Mr. CHESELDEN's Catheter, whose Sides (marked *aa*) are smooth and obtuse like RAW's; but its End *b* is left open, and not made rounding or closed, as in the other Catheters. But I am not sensible of any Advantage that attends this particular Make, nor does its Author mention any.
- Fig. 8.* Is the Incision-knife of Mr. CHESELDEN, which he uses in cutting for the Stone; whose Blade is fixed to the Handle *aa*, and its Point directly in the middle.
- Fig. 9.* Shews the concave Part of Mr. CHESELDEN's Conductor BB. having its Handle AA inclined to the left Side, for the more commodious Introduction of the Forceps through it into the Bladder; C the Extremity of its Beak terminating in a flat Point, shewn side-ways in *Fig. 10*, and in *Fig. 11*. its Handle is represented separate.
- Fig. 10.* Represents the common small Forceps of Mr. CHESELDEN, which he most frequently uses for extracting the Stone. But when the Stone is very

large, he uses a Pair three Inches longer. AA denote its Handles, which in others are usually in the Form of Rings, but are here bent in the Form of Hooks. In his larger Forceps he represents one Handle in Form of a Ring, and the other like a Hook, as here. BB are the two Jaws or Lips of the Forceps; which are made so as not to shut quite close, that they may not pinch and injure the Bladder.

Fig. 11. Represents the internal Surface of one of the Jaws of these Forceps; which is concave, and furnished with many small Teeth, inclining backward towards its Handle, that it may hold the Stone firm.

Fig. 12. Gives a lateral View of one of Mr. CHESLTON's Needles, which he uses to take up any Artery that may happen to be divided in the Operation.

Fig. 13. Shews the convex and angular Point of the same Needle marked *a*; *b* its concave or internal Part, which is smooth.

Fig. 14. The Bistoury, or Incision-knife of M. LE DRAN. A its Point; BB its two Edges for cutting; CC its two Handles.

Fig. 15. Represents a new Catheter of M. LE DRAN, which he uses for the lateral Operation instead of RAW's: *aa* denote its Handle: *ab* its Body: *bbb* its concave or crooked Part: *ccc* the Groove in its convex Part, *d* its obtuse Point closed. The Lines at *ee* shew the Length of the Fissure in its Groove.

Fig. 16. Exhibits GARENCEOT's Scalpel for Lithotomy by the lateral Method.

C H A P. CXLIV.

Of Puncturing the Perinæum and Bladder.

Puncture of
the Peri-
næum what
and where
necessary.

I. **BY** the Puncture of the Perinæum is understood a Paracentesis or Perforation made into the Urethra and Bladder, in order to discharge the Urine when it is supprest. But as this Perforation is at present made, as well in the Hypogastric Region above the *Ossa Pubis*, as below it in the Perinæum, it would in my Opinion be more proper to term it a Puncturation or Paracentesis of the Bladder. It is an Operation of so much Consequence, that, if it be not timely performed, the Patient must inevitably perish: but at the same Time it is an Operation so dangerous, that no one should presume to perform it, who is not an expert Anatomist, and a dextrous Operator. The Puncture of the Perinæum is therefore used only in those Suppressions of the Urine^a where it

^a A Suppression of Urine may proceed either from (1.) a Disorder in the Kidneys; in which Case no Urine is transmitted to, or retained in the Bladder: and therefore no Operation in Surgery can be of any Service here. Or (2.) it may proceed from some Disorder in the Bladder or Urethra, as we shall here observe. If the Urine remains supprest in the Bladder, (which may be known by the Pain and Tumor it occasions in the Region above the *Ossa Pubis*, with a Weight and Resistance upon the Rectum perceptible to the Finger there) there are then three Methods of discharging the Urine: Either, first, by the Catheter, when that can be introduced into the Bladder; for which consult Chap. CXXXVII: Or, secondly, by Lithotomy, when a Stone is the obstructing Cause; of which Operation we have largely discoursed in the preceding Chapter: Or, lastly, by an Incision or Puncture in the Perinæum, which we shall consider in the present Chapter.

cannot be discharged by the Use of internal Medicines, nor be evacuated by introducing the Catheter: for there may be some Cases in which the Catheter cannot be passed into the Bladder, even by an expert Surgeon, as appears from constant Practice, and has been before observed in *Chap. CXXXVII*. But that the Surgeon may not be ignorant of the Causes, which may prevent the Passage of the Catheter into the Bladder, he should observe that it may proceed, 1. From a violent Inflammation of the Neck and Sphincter-muscle^a of this Receptacle, whereby the natural Passage of the Urine is sometimes so closely contracted, that the Catheter can by no means be passed through it into the Bladder^b: and, if forcible Endeavours be used for that Purpose, it frequently not only increases the Inflammation and Pain, but sometimes also contuses the Urethra, so as to bring on an incipient Mortification, and Death itself. 2. The Passage may be obstructed by some Caruncle, Cicatrix, or a hard Tubercle. 3. It frequently proceeds, in old Men, from a Stricture or Shrinking of the Urethra, or by forming Wrinkles so as totally to block up the Passage of the Urine. 4. It may be caused by too great Distension of the spongy Substance of the Urethra with Blood, whereby its Canal may be so closely compressed, as frequently to deny a Passage to the smallest Tube. 5. It may proceed from a Schirrosity, or preternatural Tumor of the prostate Gland, which has been observed by the celebrated MORGAGNI^c, and by COLOT, and lately by myself in a Man at *Helmstadt*. 6. It may be occasioned from a Stone wedged into the Urethra, or Neck of the Bladder, so that neither the Urine nor Catheter can have any Passage. Therefore in any of these, or the like Cases, when the Urine cannot be discharged from the Bladder, neither by passing the Catheter, nor exhibiting Medicines recommended in *Chap. CXXXVII*. the Surgeon must then have immediate recourse to the present Operation, or the Patient will be inevitably lost.

II. There are several Methods to perform this Operation, each of which we shall briefly describe. LEAUNEAU tells us, there is nothing more required in this Operation, than to place the Patient in the same Posture as in cutting for the Stone; and then to make a large Incision in the Perinæum, cutting through the Urethra into the Groove of the Catheter, as in the *Apparatus Major*: after which he passes a Conductor or Gorgeret in the Groove of the same Catheter, gently passing it through the Neck of the Bladder, so as to make way for the Urine. But LEAUNEAU does not consider, that this Operation is not necessary when the Catheter can be passed into the Bladder: for then the Urine may be discharged through its Cavity without cutting, which ought only to be performed when that Instrument can find no Admittance into the Bladder. I shall therefore proceed to describe the Methods which are to be used, when the Catheter cannot by any Means be introduced. The first and most common of these

First Method of puncturing.

^a This may be known by the Heat and Pain felt by the Patient in his Perinæum, especially upon any Pressure there with the Finger, &c. and it will be still more sensible to the Surgeon if he introduces his Finger into the Patient's Anus.

^b What Medicines are proper to be used in Suppression of Urine from an Inflammation of the Parts, before our Chirurgical Helps are called in, we intimated before in *Chap. CXXXVII*. §. I.

^c See his *Adversaria Anatomica* III. pag. 83. where he has observed a fatal Suppression of the Urine from this Cause. But he does not say whether this Operation had been performed.

Methods, which has been hitherto used, as well by the Ancients as Moderns; is as follows. See DIONIS's Chirurgical Operations, Demonstration III. The Patient is first to be placed upon a Bed or Table in the same Posture as in cutting for the Stone, being secured by two or three Assistants. Then the Surgeon makes an Incision on the left Side of the Suture in the Perinæum, with a small and double-edged Knife, like that represented in *Tab. I. lit. I.* with which he cuts down into the Bladder. If the Urine rushes through the Wound, it is a certain Sign of his having entered the Bladder, but he should not draw out his Knife before he has passed a Probe first, and then a Silver-Tube by the Side of it into the Bladder, which Tube may be about four Fingers Breadth, made like that represented in *Tab. II. lit. P. Tab. XXIV. Fig. 3.* or in *Tab. XXXII. Fig. 4.* This Tube being left in the Wound, is to be there held firm by a flat Bandage passed round the Hips: and, after the Urine is thereby discharged, the Tube is to be stoppt with a Tent, to prevent it from continually flowing out. Whenever the Patient wants to make Water, the Tent is then to be extracted, and afterwards inserted into it again: which Process is to be repeated when necessary, till the Inflammation, and other Symptoms of the Disorder, are all removed. This first Method is indeed somewhat dangerous and severe, because thereby the Neck of the Bladder and Urethra are generally cut through without any Necessity, whereby the Inflammation becomes more violent, and at the same time also the seminal Outlets in the prostate are usually very much injured.

A second
Method.

III. It is therefore a safer and more commodious method in my Opinion, if the Incision is made in the same Part of the Perinæum, and with the same Instruments, as are customary in the *Apparatus Minor*, or in the lateral Operation, cutting into the Body of the Bladder, without injuring its Neck: after which a Silver Tube may be introduced, and the Urine discharged as before. By which means the Neck of the Bladder and Urethra are preserved entire, and the Pain and Inflammation are not increased; but the Wound heals up much sooner and with more Ease than in the common Method.

A third
Method.

IV. There is still a third Method, which seems to be preferable to either of the preceding, which consists in perforating the Perinæum and Bladder in the same Part, but with a Trocar instead of a Knife; the Figure of which Instrument may be seen in *Tab. XXIV. Fig. 1.* The Trocar being passed into the Bladder, its triangular Bodkin is then immediately extracted, while its Cannula remains in the Wound, and gives a freer Passage to the Urine in the Bladder: which Operation is not only more easy and expeditious, but the Wound itself will also heal much sooner, and with less Trouble to the Patient. Nor is it improper in this Case to pass one or two of the Fingers into the Patient's Anus, as is usual in cutting for the Stone: by which means the Instrument may be more exactly directed into the Bladder, without doing any Injury to the Rectum. GARENCEOT affirms, that no-body has wrote any thing concerning this Method: whereas it was proposed by RIOLAN in a Suppression of Urine, to perforate the Bladder when the Urine could not be extracted by passing a Catheter; and that this Perforation might be made either in the Hypogastrium, or in the Perinæum. In which latter he says the Knife is to be thrust in laterally till it has reached the Bladder, and made Way for the Urine; by which

means

means he has freed many Patients from the most imminent Danger. See *Encbirid. Anat. L. II. C. 30.* The same Puncturation was also proposed by THEVENOT, to be performed with a Knife till the Urine followed: besides which it has been also proposed in our own Time by MERIE and DIONIS. And I myself had (long before GARENGEOT) published a Chapter upon the Puncture of the Perinæum, in the first *German* Edition of my Surgery. M. CHIRAC has also proposed this Method, as we are informed by MORAND: To whom we may add TOLET, who has, in his Lithotomy, recommended a triangular Bodkin for this Purpose, though without its Cannula, of which he afterwards gives us a Figure: with which Instrument, he says, the Bladder may be commodiously perforated in the hypogastric Region. But as the Cannula cannot be easily introduced after the Bodkin is extracted, it naturally follows, that introducing them together, the one in the other at the same Time, must be the best Method.

V. The celebrated Lithotomist of *Leyden*, M. DENYS, has endeavoured to improve this Method of discharging the Urine out of the Bladder. He says, he has observed that the Surgeon is very often at a Loss to know when his Trocar is really in the Bladder, upon which Account he may thrust it in too far, so as to wound the posterior Part of the Bladder, and endanger the Patient's Life. To avoid this Accident, he has contrived a Trocar of another kind, which is here represented from him in *Tab. XXXI. Fig. 3, 4, 5.* In the Tube, *Fig. 3* and *4*, there are three Apertures in the upper Part A A, (two of which only are conspicuous in that Position) there are also as many Apertures in its lower Part B B, which are not conspicuous in *Fig. 3*, being concealed by the Plate C C. But in *Fig. 5*, which represents the Bodkin out of its Cannula, we may observe that it is made round beyond the triangular Point: but from D D to the Beginning of its Handle E E it is triangular, consisting of three Sides, which are concave; which Sides of the Triangle D E should correspond with the Apertures in the Cannula, when the Bodkin is thrust into it. By this means as soon as the Bodkin is thrust into the Bladder, the Urine enters through the upper Apertures A A, and flows directly through the lower ones, giving speedy Intelligence of the Instrument's having pierced the Bladder: after which the Bodkin is extracted, and the Urine discharged through the Cannula, which is left in the Wound. I remember TOLET says something of a Trocar like this now described, the Cannula of which is perforated with two Apertures. See his *Lithotomy, Chap. XXI.*

M. DENYS's
Method, and
Improve-
ments.

VI. Some Authors, as TOLET and COLOT, propose another Method of puncturing the Perinæum, much in the Manner of the *Apparatus Major*: in which the Patient being rightly disposed, a grooved Catheter is passed into the Urethra till it meets with the Obstacle, which prevents its further Progress, being generally near the Neck of the Bladder. The Surgeon then makes an Incision in the Perinæum, cutting through the Urethra in the same Place, and in the same Manner as in the *Apparatus Major*, till the Point of its Knife has arrived into the Groove of his Catheter; but then he does not enlarge his Incision so much, as when he cuts for the Stone: and by this means he does as it were convert the Urethra of the male into a female one. Which done, he passes a Conductor or Gorgeret through the now-short Urethra and Neck of the Bladder into

A Method
agreeable to
the *Apparatus Major*.

its

its Cavity : into which he has no sooner arrived, than the Urine makes a speedy Exit, demonstrating, at the same time, that the Instrument is in the Bladder. The Urine being thus discharged, a Silver Tube is conveyed through the Conductor into the Neck of the Bladder, where it is fixed, and secured by a Bandage, as before^a. Both the Authors now mentioned affirm, that by dividing the Urethra so near the Neck of the Bladder, a plentiful Hæmorrhage follows, which abates the Inflammation and Tumor in the Sphincter and Neck of the Bladder to such a Degree, that not only a Catheter, but a Cannula or Gorgeret may be also passed with more ease into the Bladder : and COLOT reckons up a great Number of Patients, upon which he has performed this Operation for Ulcers and Excrescences in the Bladder, as well as for a Suppression of the Urine. However, in a Suppression of Urine, I must needs think the Methods proposed at § III. and IV. of this Chapter, to be more safe and easy, both for the Patient and Surgeon : because the passing of Instruments through the contracted Neck of the Bladder must, in my Opinion, greatly increase the Pain and Symptoms of the Disorder, which may be avoided by making a Paracentesis in that Manner with a Trocar in the Bladder itself.

A fourth
Method agreeable to
the high O-
peration.

VII. Lastly, There is still another and most ready Method of performing this Operation according to the high Operation : in which the Trocar is passed into the anterior Part of the Bladder immediately above the Juncture of the *Ossa Pubis*, where the Incision is made for the Stone in the high Operation. Here the Bodkin being extracted, and the Urine discharged by the Cannula, the latter is to be secured in the Wound by a Bandage fastened round the Body, that the Urine may be retained or discharged at Pleasure, till the Cause of the Suppression be removed : after which the Wound may be healed by the *Bals. Capiv.* covered with Lint and a Plaster. Though this Operation is but seldom performed by Surgeons in a Suppression of Urine, I must needs declare it my Opinion to be very necessary and convenient when nothing extraordinary forbids, since it is also recommended by ROSSETUS, RIOLAN, and TOLET ; and since it appears from anatomical Experiments, that the Bladder may be thus safely perforated, when distended with Wind or Water, without incurring any dangerous Symptoms. And accordingly we find it has been put in Practice to good Purpose by TURBIER, MERIE, DOUGLAS, and MIDDLETON ; which two last recommend this Method of perforating the Bladder, to be more safe and easy than that in the Perinæum. We have an Instance of the Success of this Operation given us by WERLHOFF : but here the Surgeon did not use the triangular Bodkin or Trocar. He first divided the Integuments with a Scalpel, and then perforated the Bladder near its Neck with a large-sized Lancet ; after discharging the Urine, he introduced a Tube, and secured it in the Wound for nine Days. And thus the Patient was happily cured.

What is to
be done after
the Opera-
tion.

VIII. When the Cause of the Disorder cannot be removed, in a Person advanced in Years ; and when it proceeds from a Callous formed from some Fistu-

^a SAVIARD, *Obs.* 74. says this was his Method ; only with this Difference, that, instead of the grooved Catheter, he uses a straight one, (as for Women) which occasions less Pain to the Patient.

la in the Urethra, a Scirrhus of the prostate, a large Stone, a Palsy of the Bladder, or some other obstinate Malady: in such Cases the Patient should constantly keep a Silver pipe in his Bladder as long as he lives, made with a Valve and Screw to open and shut, that his Urine may not come away incessantly, but when the Patient desires it. But when the Cause is only a small Caruncle or Cicatrix in the Urethra, then the Surgeon should endeavour to remove the Obstacle after his Operation by the means intimated before in *Chap. CXXXVIII.* after which, when the Passage is cleared, the Wound may be healed up as we directed in Lithotomy. If the Suppression proceeds from any Fungus, or foul Matter in the Bladder, they may frequently be removed by suppurating and deterging Injections^a: but in such a Case it is most advisable to perforate the Bladder, rather in its lower than upper Part. Lastly, if a violent Inflammation has possessed the Neck of the Bladder, so as to obstruct the natural Passage of the Urine, it will be necessary to bleed the Patient largely after the Operation, and then to administer proper Glysters and Cataplasms, with cooling Medicines internally, in order to disperse the Inflammation and Tumor; which, if it be not effected before the third Day, the Patient seldom obtains a Cure.

IX. A Suppression of Urine is sometimes accompanied with a violent Inflammation of the Scrotum, which frequently turns to a large Abscess, or an incipient Mortification, of which COLOT has several remarkable Observations in *pag. 236, 240, & seq.* In which Cases that Lithotomist advises first, to discharge the Urine by puncturing the Perinæum, or above the *Os Pubis*, and then to lay open the Scrotum down to the Testicles, that no Blood or putrid Matter may be retained there; after which the injured Parts are to be treated with Balsamics, and Medicines proper in the like Cases. During the Cure he retains a Silver Cannula in the Patient's Urethra, to prevent any Urine from escaping into the injured Parts, which might greatly increase the Disorder. In Cases where the whole Urethra is become callous and contracted, so as to deny any Admittance to a Catheter, he then makes an Incision through the Perinæum into the Urethra, and passes his Probe through the Neck of the Bladder into its Cavity; and the Urine being discharged, he lacerates the Callus, forms a large Suppuration, separates the Callus, and restores the Parts to their former Disposition (*pag. 241, 245.*) and if a Fistula should remain behind in *Perinæo*, as sometimes happens, he then removes its Callosity by the actual Cautery. But after all, if this Method of Cure is not prosecuted in Time, but the Patient is much exhausted, there is generally no great Prospect of Success: but all Endeavours prove of no Effect, as M. COLOT evinces by weighty Observations, *pag. 350, & seq.*

Some Observations.

^a COLOT enumerates many Instances of Cures in this way, *pag. 235, 273, 277.* See also TOLET on Excrescences of the Bladder in his Lithotomy, *pag. 206.*

C H A P. CXLV.

Of FISTULÆ in PERINÆO.

The Nature
of these Fi-
stulæ.

I. **T**HESE Fistulæ are usually the Consequence of Lithotomy, or making a Puncture in the Perinæum and Bladder; or they may proceed from Abscesses in the Perinæum near the Urethra, as I have lately observed, or from a Scirrhusity of the prostate Gland; or even when the Patient is of an ill Habit, from a Wound or Ulcer, which can by no means be healed up; but its Lips becoming callous, forms a Fistulæ, through which the Urine is sometimes preternaturally discharged, to the great Uneasiness of the Patient, being by the *Greeks* called *ἑρσυνάδω*, *Cels. Lib. VII. Cap. 26. N. 2.* Sometimes these Fistulæ are formed from critical Abscesses in the Perinæum after malignant Diseases, by which the *Membrana adiposa* under the Skin, and about the Rectum, is sometimes totally suppurated, the Urethra remaining entire. But these are not properly urinous Fistulæ, and they may be treated in the same Manner as we have before directed for Fistulæ in general. Those Fistulæ which discharge Urine, are very often occasioned by the Use of Tents or Pipes, which are retained longer in the divided Parts after Lithotomy, than is requisite; or they may also proceed from a Stone which is very large and rough surfaced, in the Extraction of which the Parts are violently distended, contused, or lacerated; or, lastly, from a Stone lodged in the Urethra, which by obstructing and compressing the Parts in contact, causes a Suppuration and an Ulcer, especially if the Patient is of an ill Habit.

Prognosis.

II. The Treatment of this Fistulæ is various, according to the Patient's Habit, and the particular Disposition of the Parts affected. For when the Fistula is very large, and has consumed a great Part of the Urethra, the Patient being at the same Time of a bad Habit, it is with great Difficulty, if at all, that a Cure can be obtained; and the more difficult, as the Fistula is of a longer standing, and more callous. On the contrary, when the Fistula is small, with little or no Callosity, the Patient being young, and of a good Habit, a Cure may then be obtained both with Ease and Expedition. But if the Disorder is accompanied with a Scirrhusity of the prostate Gland, it never yields to a Cure, till that Scirrhusity is first removed, which is generally a very difficult Task, as we learn by Experience. But if the Fistula be only external, and the Urethra untouched, it is attended with less Danger, and may be cured by the Method we laid down for Fistulæ in general. This last Kind is called simple, the other complicated.

Treatment.

III. There are three Methods of treating these Fistulæ. In the first Place, the Pipe, or Tent, or whatever else is contained in the Fistulæ, should be immediately removed, and the Patient placed upon his Bed, or a Chair, in the same Manner as for Lithotomy; after which the callous Lips of the Fistulæ should be cut off, and the Parts brought together by a sticking Plaster, after they have been dressed with some vulnerary Balsam: over the Plaster should be laid

laid a narrow Compress on each Side of the Wound, and the whole retained by a strict Bandage. Which done, the Patient's Knees are to be tied together, and strict Orders given to him to lie still in Bed, that the Lips of the Wound may more easily unite with each other. For the first few Days after the Operation the Patient should be allowed very little Drink, that he may not be often excited to make water: and the Dressings should not be removed till the second or third Day after the Operation, or till the Patient can contain his Urine. When the Wound is by this Means in some measure closed, the Patient may then be kept under the same Regimen with those who have been cut for the Stone; and if he be a young Man, he may be allowed to walk about a little: by which Means, if the *Fistulæ* is not very malignant, he may obtain a perfect Cure. 2. The second Method of treating these *Fistulæ* is, by removing their Callosity with Caustics; and the Eschar which they produce may be digested off with Basilicon, or some other digestive Ointment: after which the Wound may be closed with some sticking Plaster, and proper Bandage, as before directed. As for the particular Caustic to be used in these Cases, the most commendable are *Troch. de Min.* and *Lap. Infern.* or *Mercur. præcip. alb.* mixed with *Liniment. Arcei*: or, lastly, a piece of Blister-plaster may be applied to the same Purpose, according to the Method of Mr. CHESELDEN, as we are told by DOUGLAS in the *Appendix* to his History of the lateral Operation, pag. 19.

IV. It is to be observed, that the Cure of these *Fistulæ* in the Perinæum usually comes on very slowly; especially when they are large, and their Callosity but imperfectly removed, either by the Knife or Caustic, and if the Patient at the same Time does not observe a proper Diet and Rest of Body. If from these, or such like Causes, the *Fistulæ* still continues, and renews its Callosity, it will be necessary to repeat the Incision or Application of the Caustic, till the Parts appear sound. Sometimes these *Fistulæ* are best healed by stitching the Lips of the Wound together while they are bleeding, after the callous Parts have been cut off, or they may be retained by Compresses and Bandage; and when the Parts appear to be joined, the Stitches may be then extracted, and the Dressing renewed. Sometimes it is necessary to retain a Catheter in the Urethra and Bladder, that the Urine may be discharged thereby during the whole Cure: otherwise the Urine escaping through the Wound, will greatly impede its Agglutination. Lastly, if the *Fistula* of the Perinæum is too narrow to admit of this Treatment with Conveniency, it should be either dilated with prepared Sponge, or a piece of Gentian-root, or enlarged by the Incision-knife. A remarkable Instance of one of these *Fistulæ* being happily cured by this Method, chiefly by Suture, I shall communicate in the Observations which I intend shortly to publish. For a remarkable Cure of a complicated *Fistula* in the Perinæum from a Retention of Urine and a venereal Infection, I refer you to PETIT, *Mem. Chirurg. Paris. Tom. I. p. 619.*

Further
Treatment.

V. Hitherto we have described the four Methods of treating *Fistulæ* of the Perinæum: it still remains for me to take notice briefly of a fifth used in treating this Disorder, which is usually called the *palliative Method*. To this Head belongs the Instrument described by NUCKE and SOLINGEN, and proposed by WINSLOW: I mean the Yoke which we have described in Chap. CXXXVI. for an Incontinency of Urine, that, by compressing the *Fistula* with this Instrument, the Urine may not be continually discharged through it. And thus

Palliative
Cure.

the Disorder may be in some measure mitigated, when a perfect Cure cannot be absolutely obtained. But, to say the Truth, this Instrument is very often but of little Service to the Patient, as we learn from Experience, since it permits the Urine to escape thro' the Fistula.

An EXPLANATION of the THIRTY-SECOND PLATE.

Fig. 1. Represents a human Bladder taken from a male Subject: in the anterior Part of which may be seen various empty Tubercles, or Cells, which are distended by inflating the Bladder; in which Cells the Stone lies sometimes concealed. A A A A shew the pyramidal Figure of the Bladder. B denotes the prostate Gland investing the Neck of the Bladder, which is tied with a Thread near the Urethra. C is the hollow Cell on the right Side of the Bladder, which is larger than any of the rest. D represents a less Cavity above the former. E shews a like Cavity on the left Side: another of which is at the *Fundus* of the Bladder marked F. *aaa* denote the Blood-vessels which are distributed upon the Bladder.

Fig. 2. Represents a posterior View of the same Bladder, being explicable by the same Letters: to which add G G G G Cells which are still smaller, and not to be discerned on its anterior Part.

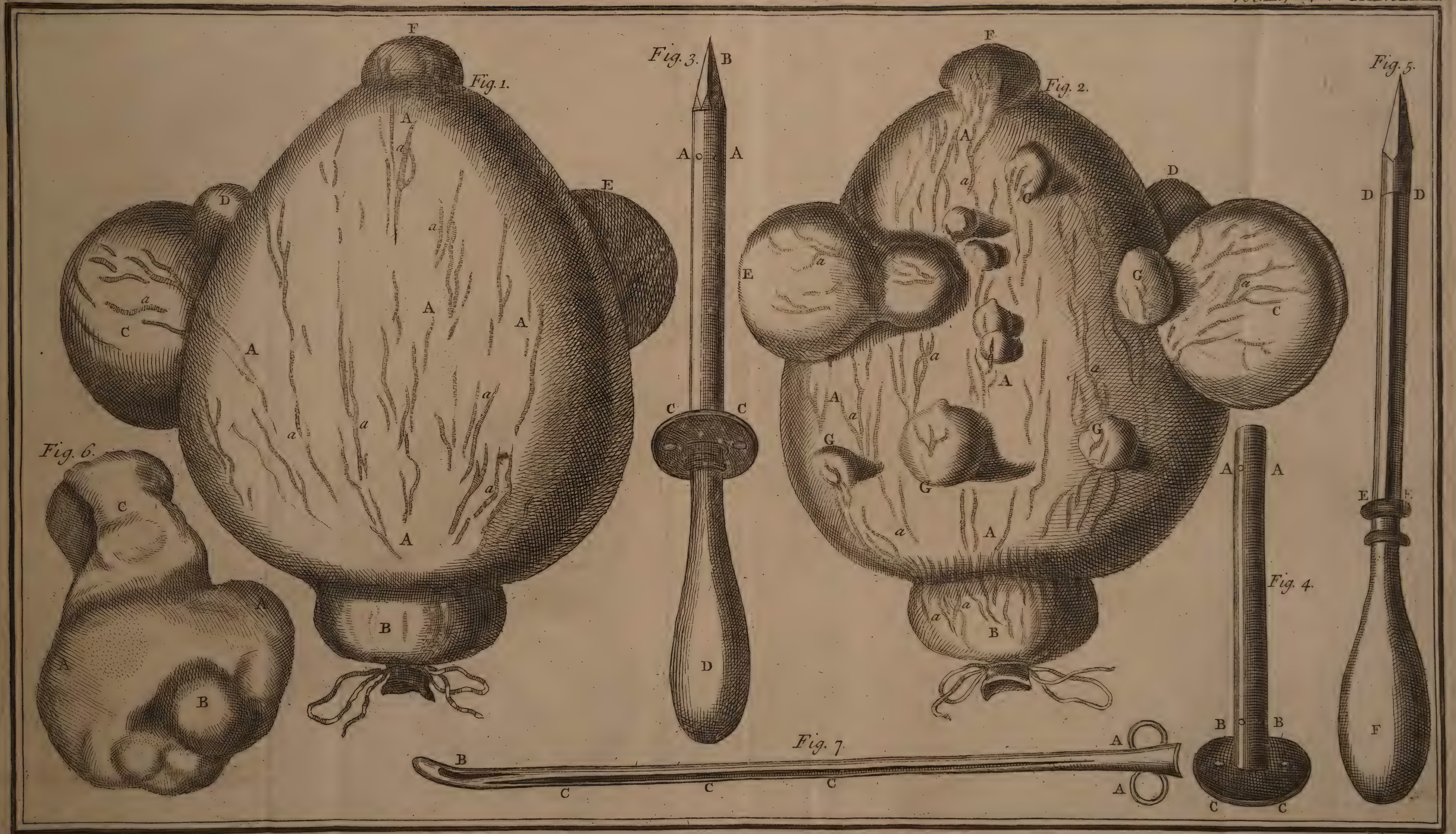
Fig. 3. Exhibits the Trocar of M. DENYS in its Silver Cannula; which differs from the common in its having three Apertures at the End of the Cannula, two of which only are visible at A A, thro' which Apertures the Urine passes into its Cavity. B the triangular Point. C C the Plate of the Cannula perforated with two Openings. D the Handle of the Instrument.

Fig. 4. Represents the Cannula of the Trocar alone: in which A A denote the Apertures at the End of the Cannula in the preceding Figure. B B represent other corresponding Apertures through which the Urine flows after it has entered by the preceding; which Apertures are not to be seen in *Fig. 3.* being obscured by the Plate C C.

Fig. 5. Exhibits the Bodkin out of its Cannula. D D, the Part of its Body immediately below the Point, which is made cylindrical to fit the Cannula: but the Part between D D and its Handle E E is triangular, and made a little concave on each Side, so as to give a Passage to the Urine: F its Handle. See more of this Instrument in *Chap. CXLIV. § V.*

Fig. 6. Represents a Stone of an uncommon Size and Figure, which I extracted without much Difficulty by the high Operation: it weighed about $\frac{3}{4}$ 4. The Reason of my representing it in this Place is for the Conviction of those who deny, that large Stones can be extracted by the high Operation. A A the Basis of the Stone which lay near the Neck of the Bladder. B a small Eminence of it which stuck in the Neck of the Urethra. C the upper Part which lay next the *Fundus* of the Bladder.

Fig. 7. Represents the Silver Catheter, which is strait and hollow for Women, being of a particular Make different from that which we before exhibited in *Tab. XXVII. Fig. 1.* A A are two Rings near its Handle. B an Aperture in its Side near its Extremity, which is to be passed into the Bladder, opposite to which there is another similar Opening. C C C a Groove in the convex Part of





of the Catheter serving for various Uses, and particularly for conducting the male Conductor into the Bladder, and for guiding the Knife when the Neck of the Bladder is to be divided, as in other grooved Catheters.

C H A P. CXLVI.

The Method of dividing præternatural Cohesions in the genital Parts of Women.

I. **W**E sometimes meet with Girls, who have no Passage for the Discharge of their Urine, by reason of the Parts growing together whilst they were in the Womb; which generally shews itself by the Infant's crying perpetually, without discharging any Urine for several Days after the Birth: in which Case she must perish if speedy Relief be not had by the Knife; for it is impossible for the Infant to live without discharging its Urine. In others again we find the Urethra so small, or the adjacent Parts so strictly united, that the Urine cannot be discharged but by Drops^a, and that with the greatest Difficulty. Sometimes the Mouth of the *Vagina*, or *Uterus*, is quite closed by the Membrane called *Hymen*; so that when they come to the Age of Puberty, their *Menses* can have no Passage, nor the Husband any Entrance, in consequence of which follow violent Pains and Tumors in the Abdomen, with Frenzy and other bad Symptoms: which has occasioned this Disorder to be observed by several prudent Physicians^b, who have denominated those who are thus affected *Atretæ*, or imperforated. *Aristotle*^c appears to have been acquainted with this Disorder, when he writes, that the "*Os Uteri* of some Women being closed or "grown together, when they come of Age, their *Menses* finding no Passage, "excites Pain so as to occasion a Rupture of the Parts by Nature, or a Division "of them by the Hand of the Surgeon. Some of these die when the *Hymen* is "either opened by Violence, or remains impervious." We again meet with some Girls, who have the Mouth of their *Vagina* shut with a Membrane, which has a small Aperture, and sometimes more, like a Net, through which the *Menses* find a Passage^d, but no Entrance is afforded for the Husband: which Disorder seldom makes itself known till Marriage.

Kinds of the Disorder.

II. This Disorder differs in different Patients. In some there are the Remains of an urinary Passage, which also lead to the *Vagina* and *Uterus*: in others the *Vagina* is so grown together, that there is not the least Appearance of any Passage; which is very difficultly, and indeed very rarely, cured. In others, again, the Urine is retained in the *Vagina*, where it is accumulated,

Difference of the Disorder.

^a Such a Case is described by ROONHUYS *Lib. II. de Clausura Uteri*, Obs. 1. p. 114. Edit: *Amstel.*

^b Among whom are BENIVENIUS *Lib. de Abdit. Morbor. Causf.* cap. 28. CABROLIUS *Observ. Anatom.* 23. FABRICIUS AB AQUAPENDENTE in *Oper. Chirurg.* Cap. de *Hymene imperforato*. HILDANUS *Cent. III. Obs.* 60. SCHENCKIUS *Lib. IV. de Part. Genit.* SOLINGEN in *Obs.* V. ROONHUYS *Obs.* pag. 124. MEEKREN *Obs. Chirurg.* 55. MAURICEAU in *Obs. de Morb. Gravid.* 231, 495. RUYSCH *Obs. Chirurg.* 32. SAVIARD *Obs. Chir.* IV.

^c *De Generatione Animal.* Lib. IV. Cap. IV.

^d An Instance of this kind we have given us by HILDANUS in *Cent. III. Obs.* 60.

and breaks forth immediately after the Birth; and in some Adults, who have no free Passage for the Urine, the menstruous Blood greatly distends the *Labia pudendi*, by which means there is a Passage shewn both to the Urethra and Vagina. Sometimes this Disorder happens in the Mother's Womb, and is therefore connate, as ARISTOTLE and CELSUS have observed. But it very often proceeds in Adults from an Exulceration in the Mouth of the Vagina, especially after a difficult Birth, when the Parts are lacerated, violently inflamed or ulcerated so as make them grow together, leaving only a small Aperture for the menstruous Blood to discharge itself, but not sufficient to give any Admittance to the Male^a. Therefore, as in new-born Infants this Disorder sometimes obstructs the Discharge of the Urine, and in Adults it intercepts (1.) the menstruous Flux, (2.) Coition, and consequently Conception and Birth, it is highly necessary to provide a Cure for it.

Diagnosis
and Prog-
nosis.

III. These Disorders are discovered in new-born Infants by their discharging no Urine for several Days after the Birth, as also by the Sight and Touch^b: but in Adults, where the Vagina is totally closed by a Membrane, the Disorder discovers itself by violent Pains in the Loins, a Suppression of the Menfes, Pain and Tumor of the Abdomen, Paleness in the Countenance, &c. but, above all, the Sight and Touch afford the surest Indications. But in those who have a small Perforation in the Hymen, the Disorder shews itself, not so much by obstructing the Menfes, as the conjugal Intercourses of the Husband. With regard to the *Prognosis* of this Disorder, if the Membrane, which occludes the Mouth of the Vagina, is thin, and only a Continuation of the Hymen, it is generally broke open at the first conjugal Intercourse: and if that has not the desired Effect, a Passage may be easily made by an Incision-knife, with the Help of an expert Surgeon. Yet when the Cohesion of the Parts is very strong and deep, the Cure must then be attended with some Difficulty, as the Thickness of the fleshy Substance may make the Surgeon liable to wound the adjacent Rectum: which Accident ROONHUYNS ingenuously confesses happened to himself. Nor is the Cure difficult upon that Account only, but also afterwards, from the great Stricture of the Parts, it will be equally difficult to dilate and keep them open, so as to recover their natural Dimensions.

Obstruction
from a
Membrane.

IV. In order to treat this Disorder with Judgment and Success, it is necessary for the Surgeon, first to have diligently considered its Nature and Disposition, if there remains any Mark of the urinary Passage, and of the Entrance into the Vagina and Uterus, the Obstruction being formed only by a thin Membrane, which shuts the Urethra, Vagina, or both, that may be commodiously divided by a cruciform Incision in the Form of the Letter X, as CELSUS advises. But if there remains a small Aperture either in its upper or lower Part, it may be then divided with a Pair of Scissars, or with a Director and crooked Scalpel, being careful to avoid injuring the Urethra and Bladder: and, if it be thought

^a Instances may be seen in the fore-cited Authors, and in PLATERI *Prax. Medic. Part I. Lib. II. Cap. 17.* BAUHINI *Anat. Lib. I. Cap. 49.* FORESTI *Obs. Lib. XXVIII. Obs. 55.* BECKERO in *Pædiæctonia inculpat.* pag. 25, & seq. where he observes this Disorder to have arisen from an Ulceration after the Small-pox. K. NOLET *Obs. Curieuses, Obs. 13. pag. 46.*

^b I had once the Care of a Maid, who had all the mentioned Symptoms, and Marks of a strict Cohesion of the Vagina near the Uterus; but by the Sight and Touch I could not find any Appearance thereof in fact.

proper, the whole Membrane may be in this Manner cut out. After which a Tent is to be spread with some digestive Ointment, and retained in the Part for a few Days by a proper Bandage: then another Tent may be spread with a desiccative Ointment; such as *de Ceruss.* or *Diapomphol.* and applied as before, 'till there is no Danger of another Cohesion in the Parts. But if the Vagina is closed by a very thick and fleshy Membrane, or an Excrescence so as totally to efface the Passage which leads to the Uterus, the Surgeon should in that Case try to find a Passage with his Finger at the Bottom of it: which done, the Part is to be marked, and the Excrescence removed by the Scalpel, as we before directed; only towards the latter End, when it is near being healed, a leaden Pipe, anointed with a cicatrising Medicine, should be introduced and retained in the Part till the Cure is compleated.

V. Sometimes the Passage of the Vagina to the Uterus is so contracted in new-married Women^a, either from an Ulcer, or other Accident, that the Husband can find no Entrance, tho' the Menfes have at the same Time a pretty free Discharge: in which Case it may be adviseable to make many small Incisions all round the Sides of the contracted Part, and then to make a Dilatation with a large Tent; as I did with Success upon the Wife of a certain Taylor. After the Operation it will be proper to renew the Dressings twice every Day, except the first, to prevent the retained Matter from injuring the Parts, which may be gradually distended with Passaries made of Sponge prepared, or of dried Roots cut in a proper Shape: and, lastly, a leaden Pipe, spread with some desiccative Ointment, may be introduced and retained in the Parts till the Cure is compleated, as before. When the Orifice of the Vagina is not contracted from the Birth, but proceeds from some external Cause, it may be treated with Success by the Method which we have now described, as I experienced upon the Wife of a Musician. A Case of this kind may be seen in SAVIARD's *Obs. Chirurg.* 32.

Obstruction
from a
Stricture.

VI. We have a very remarkable Example in CABROLIUS^b, of a Patient who was imperforated in this Manner at the Age of eighteen or twenty, her Urethra being also obstructed by a thick Membrane, so that she discharged all her Urine at the Navel, probably through the Urachus, which hung out like the Comb of an *Indian* Cock, for about four Fingers Breadth, affording an intolerable Smell of putrid Urine. To cure this Disorder CABROLIUS first divided the thick Membrane to make way for the Urine, passing a leaden Pipe through his Incision down to the Bladder. The Day after, he proceeded to the Cure of the diseased Navel, by making a strong Ligature with waxed Thread upon the pendulous Part through which the Urine was discharged. Then he cut off the Part below the Ligature, as in the Operation for Ruptures, cauterizing the Part with a hot Iron, and after the Eschar was removed, made a Cicatrization as in other Ulcers: and this he did in the space of twelve Days, in which he made a perfect Cure of the Girl. And therefore the same Practice may be used when the like Case offers, omitting the Cauterization, as being too severe and terrifying to the Patient, and not necessary in the Operation.

Of a parti-
cular Case.

^a HILDANUS *Obs.* 60, & seq. Cent III. SAVIARD *Obs.* 32.

^b *In Observat. Anatom.* XX.

C H A P. CXLVII.

*The Method of opening the Vagina when obstructed near the Womb.*Nature of
the Disorder.

I. **B**ESIDES the forementioned Disorders which obstruct the Urethra, or Entrance of the Vagina, we sometimes meet with Cases, in which the Sides of the Vagina cohere, or its Cavity is obstructed near the Womb by some Membrane; which not only denies a Passage to the Menfes, but also occasions an Accumulation of them, so as to cause acute Pains and Tumor in the lower Region of the Abdomen, together with Nausea, a wasting of the Habit, Restlessness, and the other bad Symptoms which usually precede Madness: Sometimes this Disorder is born with the Patient, and sometimes it is occasioned afterwards by external Causes, and especially a Laceration, Inflammation, or Ulceration^a of the Vagina, frequently occasioned in difficult Births. Sometimes the Obstruction is near the Mouth of the Vagina, and sometimes near the Uterus, or betwixt both. Sometimes, again, the whole Vagina, or greatest Part of it is in this Manner closed and obstructed, or filled with a fleshy Substance: which is a very dangerous Case to undertake, because the Bladder or Rectum may easily be injured in the Operation. And though, in some of these Cases, there remains a Passage sufficient to discharge the Menfes, yet they are incapable of the conjugal Offices; which has sometimes induced the married Couple to believe themselves bewitched, or to seek for a Divorce, when at the same Time the Disorder may be remedied by Art: and though a free Admittance is denied, some of them have been impregnated^b. We have a merry Relation of a Girl that was imperforated after this Manner: who, when she became sensible that she could not be debauched by any one, enlisted a great many to her Service, particularly some stout Soldiers, who, upon Trial, were all disappointed in their Expectations, bilked of their Money, and derided by the Girl, who continued as much a Maid as ever. Some Time afterwards this Girl committed herself to the Care of a Surgeon, in order to be freed from the Impediment: the Cure succeeded so well, that, in a little Time afterwards he got her with Child, and she brought him Twins into the World, as a Testimony of his Skill, and a Reward for his Trouble.

Method of
Cure.

II. With regard to the Cure of this Disorder, it generally succeeds without much Difficulty in young Girls, where the Membrane is thin, and not far from the Orifice of the Vagina, so that it may be commodiously incised. But in Adults that Operation is hardly practicable, unless when the Membrane is distended outward by the menstruous Blood: in which Case the Incision has been performed by BENIVENIUS, CABROLIUS, FABRICIUS AB AQUAPEND. ROONHUYNS, SOLINGEN, MEEKREN, RUYSCH, (*Obs.* 32.) NABOTH, (*Dissert.*

^a Thus BENIVENIUS has observed this Disorder from the same Cause in the Venereal Disease, *Lib. de abditis Morbor. causis*, cap. 31. and BECKERUS from the Small-pox.

^b V. SOLINGEN *Obs. de Mulier. Morb.* 34. ROONHUYNS *lib. cit. pag.* 127. and 130. MAURICEAU *Obs.* 489. RUYSCH *Obs.* 22. BOHNIUS in *Circ. Anat. Progyrn.* I. COWPER in *Phil. Transact.* No. 237. *pag.* 56.

de Sterilit. § 4.) AMYAND^a, and others: who relate, that after the Incision followed a Discharge of thick Blood, and a fetid Liquor, by which means the Patient has been relieved from the most pressing Symptoms and imminent Death. In these Cases the Cure has been compleated by dilating the Parts after Incision with proper Tents and Pessaries of Wax, adding towards the latter End a leaden Pipe, in order to induce a Cicatrization of the Parts. But when the Vagina is obstructed by a very thick Membrane, or very near the Mouth of the Uterus, the Case is then much more difficult, but to be performed in the same Manner as before, though with a little more Caution, to avoid injuring the Rectum and Bladder. In this Disorder it may be sometimes necessary to use the *Speculum Uteri*, represented in *Tab. XXXIV. Fig. 15.* by which Means the Parts and their Disposition may be more exactly discerned, and the Incision more easily performed.

III. If Women with Child, or near their Delivery, are thus afflicted, the Operation should be timely performed, lest it occasion a very difficult and dangerous Labour. The sooner the Incision is made before the Time of Delivery the better, otherwise when the Fœtus is large, there will be some Danger of wounding it. But when it is through Negligence or Ignorance deferred, till the Time of Birth is at hand, it is even then better to perform the Operation; than to neglect it, being careful not to wound the Fœtus. It is therefore adviseable to make at first but a small Incision in the Membrane sufficient to insert the obtuse pointed Knife, *Tab. V. Fig. 4 and 5.* to compleat the Separation of the Membrane: which may be also affected by a Director and Incision-knife, or a Pair of Scissars^b. MAURICEAU^c directs the Midwife in this Case to tear the Membrane with her Fingers: but it is much safer to divide the Parts by Incision, which is not attended with those bad Symptoms consequent on a Laceration.

How managed in Women with Child.

IV. It is to be here observed, that when the Vagina is obstructed by a thick and fleshy Substance very near the Mouth of the Uterus, the Division cannot in that Case, be performed without much Difficulty and Danger: so that it is often more adviseable to relinquish, than undertake the Cure, as was formerly done by BENIVENIUS^d. But even in those Cases, in which the Operation is not very dangerous, if the Parts are not kept open a considerable Time with proper Tents, Pessaries, or a leaden Pipe, they generally contract again, so as to give the Husband no Admission. And thus I have been obliged to repeat the Operation, and ROONHUYNS has done the same. But when the Sides of the Vagina are strictly united near the Uterus, as I observed in the Wife of a certain Butcher, whose Disorder arose from a Difficulty in the Birth, the Operation is then extremely dangerous; so that I thought it better to refrain from the Operation, though I was strongly pressed to it both by the Husband and Wife, being desirous of Children. In some Cases, where there is a thick and fleshy Substance in the Orifice of the Vagina, it frequently becomes callous, or grows up again after Extirpation, if it is not kept down by the Application of

Some necessary Observations.

^a *Philos. Transact.* No. 422. In which Case the Vagina was so obstructed with Caruncles growing soon after Delivery, that not only the Passage of the Menfes was obstructed, but also the Urethra compressed, so as to occasion a Suppression of the Urine.

^b After the Method of RUYSCH *Obs.* 22. where the Case is illustrated with a Figure:

^c *Obs. de Gravid.* pag. 489.

^d *Lib. de Abdit. Morb. Causis, cap. 31.*

Caustics and a leaden Pipe, till the Passage is sufficiently large, and its Sides perfectly healed: otherwise the Vagina will easily cohere again, or become so much contracted as to render the Operation of no effect. For more on this Disorder, the Reader may consult ROONHUYS in *Lib. II.* of his *Chirurg. Obs. de clausis Vaginis*, as also BECKERUS in *Pædioctonia inculpata*, § XXVII. & seq. ROONHUYS also treats of the Method of opening the internal Mouth of the Uterus when thus closed, *l. c.* pag. 133, & seq.

C H A P. CXLVIII.

Of the Clitoris growing too large.

Hermaphrodites.

I. IN some Women the Clitoris grows to so large a Size, as to equal and resemble the Penis of the male^a: upon which Account such Women have been called *Hermaphrodites*, notwithstanding the Clitoris is without any Perforation, and does not discharge either Semen or Urine. As the monstrous Size of this Part is a great Incumbrance to the conjugal Offices, the Surgeon's Assistance is therefore sometimes desired to remove the Impediment. This Disorder is said to have been frequent among the *Arabians* and *Egyptians*, insomuch that it was a common Practice with them to cut off the Part, which indecently appeared externally in the new-born Infant. This, however, is an Operation seldom performed among the *Europeans*: because Women, who have this Part larger than usual, are desirous of concealing it, either through Lust, Modesty, or a Dread of the Knife. But that the Surgeon may not be ignorant what to do in this Case, he should observe that there are two Methods of proceeding. 1. First, by making a Ligature upon the Part, and cutting off all below it, in the same Manner as we have before directed in removing Part of the Penis when mortified. 2dly, By cutting off the Part with an Incision-knife, according to ÆGINETA; and, after it has bled sufficiently, by stopping the Hæmorrhage with Styptics and Bandage, performing the remainder of the Cure as in other Wounds. BALLONIUS relates, that the *Indians* remove the too great Length of this Part in their Women, by applying an actual Cautery.

C H A P. CXLIX.

The Method of treating the Nymphæ when too much enlarged.

THE Nymphæ in Women are sometimes so large, as not only to hang without the *Labia pudendi*, but also to prove very troublesome to them in walking, sitting, and in their conjugal Embraces; and may therefore require the Surgeon's Assistance^b. The Operator is therefore in the first Place to lay

^a Instances of which we have in TULPIUS, DE GRAAF, PLATERUS, RHODIUS, PLAZONUS, PANAROLUS, PAULINUS, &c.

^b See an Instance in SOLINGEN de Morb. Mulier. Obs. 20. MAURICEAU Obs. 174.

the Patient in a proper Posture, and, taking hold of the Nymphæ with his left Hand, he is then to cut off so much of them with a Pair of Scissars in his right, as he shall judge necessary. But he must take care to have in Readiness Styptics for the Hæmorrhage, and Medicines to prevent the Patient from fainting. When the Operation is over, the Wound may be dressed with some vulnerary Balsam, and healed without much Difficulty in the common Method. SOLINGEN gives us an Example, in which the Nymphæ were extirpated, after they had been seized with an incipient Mortification. *V. Obs. 80. de Morb. Mulier.*

C H A P. CL.

The Method of removing Tubercles, Caruncles, and other Excrescences in the Vagina.

I. **W**E sometimes meet with Excrescences of various Sizes and Figures, resembling a Fig, Mushroom, or Pear, infesting both the external and internal Parts, and growing sometimes to such a Size, that they hang down to the Knees like the Clapper of a Bell, and prove exceeding troublesome both in Bed, Walking, or Sitting: They often prove the Seat of violent Pains, and sometimes of a Mortification, or Cancer, especially when they are overgrown, and not timely removed: these are usually called *Sarcomata* of the *Uterus*. CELSUS^a, and TULPIUS^b call them by the simple Name of *Fungus*; but SOLINGEN^c terms them *fici*, and sometimes *cancerous*: but they are improperly and injudiciously termed cancerous, since they easily yield to a Cure; which is not in the Nature of that Disorder. The nearer they are to the Mouth of the Vagina, the more easy it is to remove them, which is a very difficult Task when they lie deep; so that TULPIUS terms it a very uncommon Operation for a Surgeon to cut off Tumors of this kind. Some have falsely esteemed them to be a *Prolapsus Uteri*, without any Manner of Reason, as I shall presently demonstrate.

Nature of
the Disorder.

II. These Disorders may be treated in the same Method before proposed for Tubercles and fleshy Excrescences in general, *Chap. XXVII.* removing them either by Ligature^d, the Knife, or Caustic Applications used either separately or conjunctly: but Care should be taken not to mistake a *Prolapsus Uteri* for an Excrescence of this kind. For the rest, as Excrescences in this Part are very difficult to be come at, like Polypuses and Caruncles in the Nose, it will be therefore necessary to make use of the Pliers or Forceps directed by FABRIC. AB AQUAPEND. and DIONIS, for extracting Polypuses of the Nose. See *Tab.*

Treatment.

^a Lib. VI. Cap. 18. N. 11.

^b Obs. Med. Lib. III. Cap. 33 and 34.

^c Obs. de Morb. Mulier. 29 and 56.

^d An Example may be seen in MEEKREN, *Obs. Chirurg.* Cap. 51. with a Figure of it. Sarcomas of the Uterus have been also lately removed by VATERUS, as he tells us in a Dissertation on the Subject, by making a Ligature round the Root of the Tumor, and then extirpating it with the Knife, as I have also done myself.

XIX. with which Instrument the Excrescence may be twisted off. But before this Method be undertaken, it ought to be considered, whether the Patient can undergo the Operation, without being exposed by it to greater Injuries. VOLTERUS, a German Surgeon, tells us, that he has, with Success, extirpated many of these Excrescences in the genital Parts of Women by a red-hot Incision-knife; which is a Practice in my Opinion rather to be abhorred than encouraged. SOLINGEN relates, that he happily extirpated a cancerous Excrescence in the Vagina of a Woman, who recovered in a short Time; but he does not tell us by what means he performed this Cure, nor does he instance the Reasons which he had for calling it cancerous^a.

C H A P. CLI.

The Method of extracting the Stone in the Bladder of Women.

Women less
subject to
the Stone
than Men.

I. **W**OMEN are not so often necessitated to undergo the Operation for the Stone as Men, because they are not so subject to the Causes which produce it. For, in the first Place, they are more regular in their Diet. Then their urinary Passages are more lax, short, and open; by which means the small Stones, which are formed in their Kidneys, Ureters, and Bladder, are generally discharged before they are much increased, along with the Urine in its Passage through their short and yielding Urethra; and even when they have been retained and enlarged in the Bladder for a considerable Time, their Urethra so easily dilates, that we are furnished with many Instances of pretty large Stones making their Escape without any Assistance from the Surgeon. Thus I had a Stone brought me weighing two Ounces, in Figure and Size like a small Hen's Egg, but a little flatter^b, which was discharged from a Country-woman in the Neighbourhood, after she had suffered the most excruciating Pains, like those of Labour. Upon this Account it is a common Observation, that fifty of the male Sex are usually cut for the Stone to one of the female: and MOLINEAU

^a Vid. KERKRING. *Spicileg. Anat. Obs.* 53. MEEKREN *Obs. Cap.* 54. SOLINGEN *Obs.* 29. N. 50. RUYSCHE *Obs.* 6. CELSUS *Lib. VII. Cap.* 30. N. 11.

^b The Writers of Observations furnish us with many remarkable Histories of this Nature, and particularly BORELLI (*Cent. II. Obs.* 22.) gives an Account of a Stone coming spontaneously from a Woman, which was as large as a Goose-egg. KERKRINGIUS (*Spicil. Anat. Obs.* 67. *pag.* 163.) has observed one of above three Ounces Weight: and BARTHOLIN describes a Stone thus discharged as big as a Hen's Egg, in *Hist. Anat. Cent. I. Hist.* 71. — In *Miscell. Nat. Cur. Dec. I. Ann. VI, VII. Obs.* 7. we have an Account of a Stone thus discharged, weighing an Ounce and an half: and we have afterwards an Account of two other Stones weighing each two Ounces and an half, *Dec. ejusd. An. VIII. Obs.* 11. *pag.* 20. & *Dec. II. An. II. Obs.* 180. and in *Dec. III.* we have more Instances; as we also have in DE GRAAF *de Mulier. Organ.* and in the *Philos. Transactions*. But more particularly remarkable are those Stones, which were voided in great numbers for a long time running by a Woman of *Wolfenbuttle*; a Description of which we have from D. HIERONYMUS, in a particular Dissertation published *An.* 1711, who has shewn me several of them now in his Possession, which weighed about two Ounces. Among others the Reader may also consult TULPIUS *Obs.* 5. *Lib.* 3. MEEKREN, and MIDDLETON *History XI.* and COLLOT *Lib. de Lithot. pag.* 289. which equalled a Goose-Egg, with many more Accounts of the same Nature in the Writers of *Observations*.

even reckons, that there is not above one Woman to be found among a hundred calculous Patients, which have undergone the Operation at *Paris*.

II. But notwithstanding Women have naturally this Advantage of discharging small Stones more easily than Men, yet they sometimes stand in need of the Surgeon's Assistance, when the Stone is retained in the Bladder from a Stricture of its Sphincter or Neck; till, having grown to a large Size, it occasions the most exquisite Pain, and other Symptoms, so as to render the Extraction of it absolutely necessary, when lithontriptic and diuretic Medicines prove of no effect.

Extraction often necessary.

III. Another great Privilege enjoyed by the female Sex over the male is, that they may be generally freed from the largest Stones, barely by dilating the Neck of the Bladder and Urethra, without the dangerous Operation of cutting. It is even surprizing to what a Degree the Urethra and Neck of the Bladder may be dilated in Women, without incurring any great Damage: which is a Circumstance proved not only by the many Instances of very large Stones, being this way discharged without chirurgical Helps, but also by the numerous Testimonies of the most considerable Lithotomists, as HILDANUS, TOLET, GREENFIELD, ALGHISH, and others. We have a very remarkable Case published in *Miscell. Nat. Cur. Obs. Dec. II. An. X. pag. 147.* where the Woman was freed from a Stone weighing five Ounces and a half, barely by dilating the Urethra. Nor are the Cases less remarkable published in *Philos. Transact.* N. 202, 236, and elsewhere: though it must be confessed, that the Operation succeeds much better in young than old Patients.

Incision often unnecessary in Women.

IV. The Case being thus, there are not so many Instruments required to extract the Stone from Women as from Men. However, there are more Methods contrived to extract the Stone from the former than from the latter; which may, for Distinction's sake, be divided like the Method of Lithotomy in Men, into the *Apparatus Minor* & *Major*, with the high and lateral Operation: each of which may be again performed by different Methods. We shall begin here with the first: which may be performed variously, according to the particular Circumstances of the Case. But before we enter upon this Subject, it will be necessary to consider what Method will be most convenient, since there are several. The most ancient of them described by CELSUS, is commonly termed the *Apparatus Minor*.

The Method of extracting various.

V. The ancient Author of the *Apparatus Minor*, CELSUS^a, tells us, that when the Stone is small, the Use of the Knife is unnecessary; because it may be generally forced through the Neck of the Bladder with the Urine, or if it sticks by the Way, it may be extracted with a Hook^b. But when the Stone is too large to be this Way extracted, the Surgeon is then to pass his Finger into the *Anus* or *Vagina* of the Patient, in order to press the Stone towards the left Side of the^c *Perinæum*, and to cut upon it as in Males. This is agreeable to the Direction of ALBUCASIS, who advises to pass two Fingers in this Manner into the Patient's *Anus*, or *Vagina*, in order to find the Stone, and thrust it downwards towards

Apparatus Minor.

^a *Lib. VII. Cap. 26. N. 4.*

^b By which means SAVIARD extracted a Stone from a Girl, *Obs. 86.*

^c Some of the Moderns advise to press upon the Abdomen and Bladder with the right Hand, whilst the left is searching in *Ano*.

the left Side of the Anus, or Tubercle of the Ischium; that, being felt by the Fingers externally in the Perinæum, an Incision may then be made down to the Stone, without injuring the Bladder, and the Stone appearing is to be thrust out by the Fingers *in Ano*, or extracted as in Men. MEEKREN also uses this Method of passing his two Fingers into the Vagina, to expel the Stone when it sticks in the Urethra; by which means, with the Assistance of a Hook, he seldom fails in his Intention. This Method has been also generally received; only with this Difference, that some first of all dilate the Urethra with Instruments^a: others divide it according to Necessity, and then extract the Stone with a Hook, or Pair of Forceps, when it cannot be pressed out by the Fingers only. But then the Operation in my Opinion ought to be referred to the *Apparatus Major*. The celebrated *English* Surgeon Mr. JOHN DOUGLAS has proposed a new Method for the Extraction of a small Stone, agreeing with the *Apparatus Minor*, by which the Urethra is to be gradually dilated with Tents made of Gentian Root, or prepared Sponge, till the Capacity is sufficient to admit the Forceps for extracting the Stone^b. The Existence of the Stone in female Patients may be known by the Symptoms which it occasions, and by searching with the Catheter and Finger^c, as we before proposed for the *Apparatus Minor* and *Major* in Males. The Woman is to be also secured in the same Posture, and the *Labia Pudendi* with the *Nymphæ* are to be held asunder by the Assistant, whose Office was to hold up the Scrotum in the male, that the Lithotomist may have a clear View of the Parts below the *Clitoris*. See *Tab. XXIX. Fig. 2. Lit. D.* Which, being rightly performed, the Surgeon may proceed to his Operation by the Method which shall appear to him to be the most convenient. When one Stone is extracted, he should then search for more, if any, and extract them in the same Manner. But there will be seldom any Occasion for binding the Patient in this Method, especially when the Stone is small, and the Extraction of it may be made by placing the Patient a-cross a Bed.

Apparatus
Major.

VI. There is another Method of extracting the Stone from Women, which agrees with the *Apparatus Major* used for Men, and may be therefore termed the *Apparatus Major* for Women; since it requires more Instruments for performing it, which are not very different from those used in the same Method for Men. But there are several Ways of proceeding, as well in this as in the preceding Method: but the following is mostly used among the Moderns. The Woman being disposed upon a Table, like the Male for the *Apparatus Major*, and lateral Operation, being secured by Assistants, and the *Labia Pudendi* and *Nymphæ* held open as before, the Operator proceeds to pass a male and then a female Conductor, *Tab. XXVIII. Fig. 2 and 3*, thro' the short Urethra into the Bladder, according to the Directions given for the *Apparatus Major* in *Chap. CXL*. In the next Place, the Surgeon gradually dilates the Neck of the Bladder and Urethra, by opening the Conductors. See *Tab. XXIX. Fig. 2. B. C.* Then he passes his Finger, and after that a Pair of Stone Forceps, *Tab. XXVIII.*

^a As TOLET advises in his *Lithotomy*, *Chap. XV*. But HILDANUS thinks this Method dangerous, and apt to be attended with an Incontinency of Urine.

^b When the Stone is too large to be thus extracted, Mr. DOUGLAS advises to cut for it by the high Operation. See his *Lithotomy* Edit. 2. pag. 55. and *Philos. Transact.* No. 399.

^c The Size of the Stone may be best judged of by the Finger.

Fig. 5. between the two Conductors into the Bladder, and by them still further dilates by Degrees the Neck of the Bladder sufficient to admit a Passage for the Stone; which is to be extracted with the Forceps, as we before directed in Men^a. This may be generally done without much Difficulty, when the Stone is small, smooth-surfaced, or of a moderate Size. But when it is large, the Task is harder: however, the Urethra is then also to be gradually dilated till the Stone follows. When the Stone cannot be readily found with the Forceps in Women, the two Fore-fingers of the left Hand may be passed into the Vagina, and the Stone thereby thrust into the Mouth of the Forceps: but in Girls it may be sufficient to pass one Finger only into the Anus. But if, after all, the Stone proves too large to be thus extracted, the Operator should then use a pair of stronger Forceps made with large Teeth, represented in *Tab. XXVIII. Fig. 7.* and endeavour to break the Stone, that it may be extracted in pieces. But if the Stone is too hard to be broke, or if we are desirous to extract it whole, it will then be necessary to divide the Urethra, either in one or both Sides. If there be Occasion, he may, in my Opinion, venture to divide some Part of the Neck and Body of the Bladder itself, since that may be safely done in Men in the lateral Operation, as we are assured by the Instances of RAW, CHESELDEN, LE DRAN, and others. HILDANUS^b indeed thinks it dangerous to divide the Neck of the Bladder; but we are satisfied it was only from the prejudiced Notion then entertained by the Ancients after HIPPOCRATES. And PAREY^c seems to approve of this Operation, since he has recommended and represented a particular kind of grooved Catheter for dividing the Urethra in Women when there is occasion: which Instrument is also approved by COLOT, and agrees with that represented by us in *Tab. XXXII. Fig. 7.* Some Lithotomists use a cannulated Conductor, through which they pass the Forceps into the Bladder as in Men. To prevent an Incontinency of Urine from the great Distension of the Parts, it may be serviceable to apply an astringent Fomentation for a few Days; though this is an Accident which does not so often happen in young, as in old Patients: yet, if the Parts are wounded, it will be also necessary to treat them with vulnerary Medicines.

VII. MARIANUS thinks it most adviseable to leave the Expulsion of small Stones to Nature, as the Urethra in Women is very short and lax: but if the Stone is very large, he thinks it will be necessary to extract it by the Method proposed for Men. But the Place to be incised, he says, is in Women between the *Os femoris* and Urethra: so that when the grooved Catheter is in the Bladder, the Operator is to thrust the End of it outward towards the Perinæum, in order to cut upon it as we before directed. In the mean Time an Assistant is to hold the *Labia Pudendi* and *Nymphae* on the left Side towards the right, that the Operator may have a distinct View of the Part to be incised; which he then proceeds to divide about a Finger's breadth from the Thigh, making his Incision and Extraction in the same Manner, and with the

Some Variations.

^a This is the Method described by TOLET (*Cap. XV.*) SAVIARD (*Obs. Chirurg. 72.*) and GARENGEOT without mentioning any other way; though it is certain, that the *Apparatus Minor* may be used, when this here described is not so convenient.

^b *Lib. de Lithot. Cap. XXII.*

^c *Lib. XVI. Cap. 47.*

same Instruments as in Men. Nor should the Surgeon be terrified, says MARIANUS, if the Operation be attended with a more copious Hæmorrhage in Women than Men^a. Though the particular Part to be incised is not so distinctly pointed out by MARIANUS, as we could wish; I am apt to think that he meant the same Place in which JAMES and RAW made their Incisions in Women. Some Operators use a peculiar Instrument commonly called a *Dilatator* in order to open the Parts; which Instrument they pass between the two Conductors, in order to dilate the Neck of the Bladder before they introduce the Forceps and extract the Stone. For my own Part, I usually thrust my Fore-finger, instead of the forementioned Instrument, between the two Conductors, and pass the same into the Bladder, as I before observed in the *Apparatus Major*, in order to make Way for the Forceps: by which Method the said *Dilatator* may be omitted, and the Neck of the Bladder more gradually and gently dilated. Some Lithotomists^b rather advise to enlarge the Urethra by Incision, or even to cut into the Body of the Bladder itself, than to contuse and lacerate the Parts by a too violent Distension, which will be attended with many bad Symptoms that may be avoided by Incision. Others^c again affirm, that there is never any Occasion to divide the Parts by the Knife; which they say will be attended with worse Symptoms than a bare Dilatation: in favour of which Opinion they alledge the Instances of large Stones being discharged by Nature without any Incision; and by Art, only making a Dilatation. This Opinion is much countenanced by MOLINEAU of *Dublin*, (*Phil. Transact.* N°. 202.) and in Part confirmed by Cases which he enumerates, and particularly a Girl of six Years old, whose Urethra was so largely dilated by M. PROBY of the same City, by means of a *Speculum Vesicæ*, that he afterwards introduced the Forceps, and extracted the Stones with Ease. He reports the same also of two adult Women, and gives us the Figures of the Stones extracted; concluding, that if the Urethra may be thus dilated in young Subjects, it may be much more so in those who are adult, so as to make it altogether unnecessary to wound the Urethra or Bladder. But it is to be observed, that the Stones thus extracted were all of them but small, the largest of them hardly exceeding the Size of a Pidgeon's Egg: and I readily grant, that much larger than them may be this way extracted. But Stones of all Sizes cannot be thus taken from the Bladder, as Mr. WOOD^d affirms, and proves by a Case of a Woman whom he happily cut, and freed from a Stone weighing $\frac{3}{4}$ ix, which he reasonably asserts to have been impossible to extract barely by Dilatation. Therefore the Method of extracting Stones from Women ought to be prudently varied, and managed according to their Size, Figure, and other Circumstances. Some pass a grooved Catheter into the Bladder before the male Conductor, that the Point of the latter may pass in through the Groove of the former. See (*Tab. XXXII.*) after which they introduce the other Instruments through the Cavity of the Male Conductor.

^a Which has been also advised by CELSUS Lib. 7. Cap. 26. N. 4. And at N. 5. he says, that the Blood ought not to be directly stopped in robust Patients, to prevent any Inflammation of the Parts.

^b As ROSA and SCHAFFERUS in *Dissert. de Calc. Argentorat.*

^c LAVATERUS *Dissert. de Calc.* pag. 231.

^d *Philos. Transact.* N. 209.

VIII. Frere JACQUES usually cut Women in the same Manner as he did Men. But I do not know that his Method was followed by any but RAW^a; the Generality of Lithotomists having adhered to the preceding Method, and rejected the lateral Method for its Danger and Difficulty^b. But I must declare it as my Opinion, that both of those Methods may be practicable to the Advantage of the Patient, whenever the Stone is found to be too large to pass the Urethra without greatly injuring the Neck of the Bladder. Nor is there any Danger of weakening the Neck of the Bladder by cutting according to JAMES's Method, provided the Operator is cautious not to wound the Rectum, or Vagina, which was generally the rash Practice of JAMES. Indeed those Accidents may be easily committed, as appears from the Observation of SERMESIUS, who, upon opening many female Subjects that had been cut by the lateral Method, especially Girls and Maids, found the Vagina entire: but in all that had borne Children, the Vagina was wounded, which is a Circumstance that I myself have frequently observed in dead Subjects. FALCONET also declares, that there is much more Caution required to perform the lateral, than any other Method of Lithotomy in Women: and therefore he thinks it most adviseable to cut by the high Operation, when the Stone is too large to be extracted through the Neck of the Bladder. Otherwise, he approves of dividing the Vagina with the Bladder and its Sphincter by cutting in the Groove of a Catheter, which Incision is better performed upon the Stone itself thrust towards the Neck of the Bladder, according to the Opinion of BUSSIÈRE^c. SHARPE also seems to agree with this Opinion. Not much differing from the preceding is the Method proposed for Women by MERIE; who, in order to prevent the Neck of the Bladder from being contused or lacerated by a too violent Dilatation, which would cause an Incontinency of Urine, advises to pass a grooved Catheter into the Bladder, and to cut through the Sphincter-vesicle, together with the contiguous Part of the Vagina^d as in Males: by which means the Stone may be extracted without dilating, contusing, or lacerating the Neck of the Bladder, only by dividing it, which is not attended with the malignant Symptoms of the former, but heals up in a short Time. For we find that it was an Observation, and even a Rule with Physicians in the Time of CELSUS, that incised Wounds were less dangerous, and more speedily to be cured, than those which were contused or lacerated. And therefore it is the less surprising that HILDANUS should have freed a Woman from a Stone as big as a Hen's Egg, by cutting almost in the same Method through the Vagina, and Part of the Bladder; dilating the Wound partly with his Finger, and partly with the Knife down to the Neck of the Bladder, sufficient for the Extraction of the Stone by the Forceps: and thus he made a per-

By the lateral Method.

^a *Oratione de Methodo Anatomiam docendi*, pag. 37. where he mentions one Girl among the vast Number of Males he had cured.

^b Indeed M. DENYS recommends the Method of RAW for Women (*Obs. de Calc.* Cap. X.) but does not give us any Instance of himself having performed it; and though RAW tells us he performed it on a Girl of four Years old at *Leyden*; yet I cannot learn, that it has been undertaken by any of the French or English Surgeons.

^c *Phil. Transf. Abr.* Vol. III. pag. 185, & seq.

^d This Practice was described before MERIE by Dr. LISTER in his Journey to *Paris*, pag. 237; where he says, Women are most easily cut by passing the Scalpel through the Vagina into the Bladder.

fect Cure of the Patient. See *Cent. I. Obs. 68. Cent. III. Obs. 69.* where he relates the Case of an Ulcer perforating the Bladder and Vagina, through which many Stones were discharged: the Parts healing afterwards, shew Wounds therein to be curable.

DOUGLAS'S
Method by
the high O-
peration.

I X. We have another Method proposed by DOUGLAS, when the Stone is too large to be extracted through the Neck of the Bladder, by dilating it with a Tent of Gentian Root, or prepared Sponge, sufficient to admit the Forceps, as we observed § V. In this Case Mr. DOUGLAS approves of cutting by the high Operation; that is, by distending the Bladder with warm Water, and compressing the Urethra, by inserting the Finger in the Vagina, after which an Incision is made into the Bladder immediately above the *Os Pubis*, as we before directed for the high Operation in males. I must needs approve of this Method when the Stone is very large, and the Patient young and healthy, (whose Wounds heal easily) because in this Way there is no Danger of wounding or weakening the Sphincter of the Bladder, so as to bring an Incontinency of Urine. But for small Stones I prefer the *Apparatus Major* and *Minor* proposed in this Chapter, as being less dangerous. Of which Opinion we also find MORAND, who says, that when the Stone is small in Women, it may be extracted by dilating in the common Method: but if it be large, the Patient should be cut by the high Operation, to avoid an Incontinency of Urine, which is otherwise a very frequent and troublesome Symptom.

The Stone
formed on
Bodies thrust
into the
Bladder in
Women.

X. It is to be observed, that Stones in Women are sometimes formed, not spontaneously, but by an Incrustation of large Needles, or the Bodkins which they use in their Hair, or such like Bodies, slipping into the Bladder, in pushing back a Stone from its Neck; or perhaps thrust into those Parts with a lascivious Design. For whenever there are any foreign Bodies of that kind in the Bladder, the earthy and tartarous Parts of the Urine adhere to their Surface, and in Time form very large Stones. Instances of this kind we have several given us by MOLINET, ALGHISH, GREENFIELD, CHESelden, and others. But the most surprising of all is that in the *Philosophical Transactions*, N^o. 260, of a Girl about twenty Years old, from whom Mr. PROBY extracted the Stone by the high Operation without distending the Bladder, the Basis of which Stone was a Hair-pin, which had been swallowed, and made its way into the Bladder. But I am apt to believe, that that Pin, which was about the Length of six Fingers Breadth, and proportionably thick, could not easily be swallowed, nor make its way through the Stomach into the Bladder: I rather believe that it was pushed through the Urethra, with a lascivious Design by the Girl, who, according to that Author, was of a warm and sanguine Habit. It is remarkable, that this Instance of cutting by the high Operation with Success, was not observed or mentioned by any of the *English* or *French* Lithotomists, who have writ upon that Method; notwithstanding it is one of the greatest Arguments in Favour of the Operation, which they endeavour to recommend: and therefore one would imagine the Case had slippt their Notice^a.

^a In the *Philosophical Transactions* N^o. 168. Dr. LISTER gives an Account of a Lad cut by COLOT, the Basis of whose Stone was found to be a Needle, which he had thrust into his Bladder about two Years before. To which I may add, that my Son saw SENFFIUS (at Berlin in 1735) extract a Stone from a Man, in which was found a Spike or Beard of Barley: but by what means it came there, neither the Patient nor any body else could imagine.

O F M I D W I F E R Y.

C H A P. CXLII.

The Method of treating difficult Births, the Fœtus being alive.

I. **H**ARD Labour is, when the Mother is not delivered in the short and usual Time of about the Space of an Hour^a, the Exclusion of the Fœtus being impeded by various Causes, which render the Birth impracticable, without some Assistance from the Hand of the Midwife. This is by the *Greeks* called *Δυστοκία*. The primary Causes of a difficult Labour are either in the Mother, the Midwife, the Fœtus, or the Membranes that inclose it. And (1.) in the Mother the Cause may be a bad Conformation of the Parts, particularly the Bones of the *Pelvis*, with the *Os sacrum* and *Coccyx*, as in crooked Women; by which means the Capacity of the *Pelvis* is too narrow to exclude the Fœtus in the natural Way, or even to admit the Hand of the Midwife to its Assistance. As likewise if the Mother be a Dwarf, or very low of Stature, the Labour is generally exceeding difficult. And it goes hard for the most part with hump-backed Patients, and particularly those, whose Wombs are obliquely situated, inclined either to one Side, or forward or backward. Another Cause may be the Age of the Patient, being either too young or too old, or being too tender and timorous: Or she may be of a melancholic Disposition, throw herself into Despair, and check the Efforts of Nature; or untractable and obstinate, and not assist her Labour-pains by straining. I have seen Instances of some, who, when their Posture was advantageous and Circumstances favourable, have started up on a sudden, like mad Women, and disappointed the Labour. If, lastly, the *Vagina Uteri*, the *Hymen*, or other Membrane, be closed, if there be a Swelling, Excrescency, or Callous in the Vagina, the Passage may be so obstructed as to hinder the Exclusion of the Fœtus, or even the Admission of the Hand. And too great a Fulness of Blood, or long-retained and indurated Fæces may be likewise numbered among the Causes of a difficult Labour on the Mother's Side.

Observations previous to the Art of Midwifery.

Cause of difficult Birth in the Mother.

II. The Birth may be rendered difficult by the Midwife's Fault, if she endeavours to force it prematurely on account of false Pains or for other idle Reasons, while the *Os Uteri* is yet closed: for thus the Patient's Strength is unseasonably exhausted. The same will happen, if she breaks the Membranes of the Fœtus too soon, and discharges the Waters before their proper Time, which are absolutely necessary to a successful Birth. Likewise, if she is so ignorant, as not to correct trivial Errors, which are easily corrected: for Instance, if the Fœtus should present one or both Feet, and, instead of extracting them, she returns

In the Midwife.

^a It is not the Business of this Place to explain the Nature and Causes of natural Births; for that Doctrine, I suppose, the Reader may be acquainted with from Anatomy and Physiology.

them into the Womb; in these and the like Cases, she will not only render the Birth very difficult, but often destroy both the Mother and Child.

In the Fœtus or its Membranes,

III. The Cause may be in the Fœtus, when it is over-sized, or has too large a Head; (such are Infants which have watery Heads, two Heads or two Bodies, or are in any way monstrous or preternatural Productions) or if it die before, or at the Time of Delivery; in which Case the Birth is generally more difficult than when it is living and active, and by that Activity excites, stimulates and assists the Pains of the Mother. Likewise, if the Fœtus, whether dead or alive, presents itself in an irregular and unnatural Posture; many Instances of which we have given in Plate XXXIII. *Fig. 4 to 12.* And many more may be seen in the several Writers on Midwifery, by which the Birth is frequently rendered difficult, and sometimes quite impracticable. Lastly, when the Membranes of the Fœtus are so thin that they burst too soon, and discharge the Waters prematurely; hence arises, what they call a difficult and dry Birth. Or if these Membranes are so tough and obstinate, as to retain the Waters beyond their proper Time, they often check and retard the Exclusion of the Fœtus.

What the Physician should do,

IV. When several of these Causes concur, the Delivery is so much the more difficult. Whenever a Physician, Surgeon, or Midwife is called to a Woman in her Labour-Pains, their first Business is to enquire, whether the Birth is mature, or the Woman gone her full Time of nine Months; and, whether the Swelling of the Belly is perceived outwardly to have descended, which indicates the turning of the Fœtus towards the Birth: In the next Place, they should see if there flows from the Parts a Kind of mucous Humour streaked with Blood; and, lastly, examine whether the *Os Uteri* is relaxed or closed. For when that Time is not expired, and no other Labour-pains^a are felt, the Infant presenting itself, and the *Os Uteri* not being relaxed, in that Case both the Application of the Hand, and Medicines which promote the Birth, ought to be carefully avoided. Care should rather be taken to dispose the Patient to rest in a warm Bed, and to endeavour to remove the false Pains by a prudent Exhibition of proper Medicines internally, with the Application of discutient and strengthening Cataplasms and *Sacculi*; by which Means the Patient frequently goes her proper Time. It is to be wished, the Fault of exciting immature Births by Medicines, was not so common as we generally find it, by which unskilful Treatment, Death is too frequently brought on. But if the Woman has gone her nine Months from the Time of Conception, and her true Labour-pains appear, which may be known by their proceeding from their Loins downward towards the *Pubes*, the Limbs at the same Time trembling; and attended with an urging Tenesmus and Relaxation of the *Os Uteri*, the Method of examining which, see *Tab. XXXIII. Fig. 1.* In that Case the Woman should be put to Bed, and use all her Endeavours to promote the Delivery, or she may be

^a Labour-pains are usually distinguished into *true* and *false*, or *spurious*; the true are those which come upon a Woman at or near the End of her full Time, and, beginning at the Loins, proceed downward to each Inguen, and to the Parts of Generation: the false, or *spurious*, are those perceived in the upper and middle Part of the Abdomen, like a Cholick, arising from Wind, or Indigestion, and are no Sign of Delivery. The true Pains are also distinguishable from the *spurious*, by the *Os Uteri* dilating or relaxing itself in the first, but continuing contracted or closed in the last.

placed in a Chair contrived for that Purpose; and if her Delivery does not succeed, notwithstanding the Relaxation of the *Os Uteri*, it may then be necessary to use other proper Means, which we shall presently describe.

V. But, first, it may not be amiss to observe, that it is customary with the *French*, and several other Nations, to deliver their Women upon the Bed; but in *Germany* that Business is usually performed sitting in a Kind of Chair for that Purpose, represented in *Tab. XXXIII. Fig. 14.* which last Method is, in my Opinion, much preferable on several Accounts. And first, because they can better exert their Strength, by fixing their Feet upon the Ground, and their Back against the Chair A, their Thighs upon the Cross board C, which has a semicircular Piece cut out of it; that the *Os coccyx* may have room to bend back, the Patient at the same Time holding the two Handles DD fast in her Hands: and thus the Patient can not only exert her Strength to more Advantage, but also the Midwife and her Assistants can have better Access to perform their Office. In Places where one of those Chairs are not to be had, two common Chairs of the same Height may be placed together, about six or eight Inches distance from each other, and tied fast in that Position, that the Patient may sit with a Thigh upon each Chair, and her Genitals hanging over the intermediate Space betwixt them; by which means the *Os sacrum* and *coccyx* have their free Liberty to recede at the Time of excluding the Fœtus. Among the Country-Folks, and meaner Sort of People in *Germany*, it is sometimes customary for the Husband, or a strong Woman, to sit down in a common Chair, taking the Patient upon her Thighs, and holding her in their Arms, perform the Office of the Laying-Chair.

The Situation of the Patient.

VI. But it is previously necessary for the Surgeon or Midwife to have had an Idea of the Form and Situation of the *Os Uteri*, either from Anatomy or Anatomical Figures of the Part which is represented in *Tab. XXIX. Fig. 2. I.* or *Tab. XXXIII. Fig. 1. C.* and in the next Place they are to observe that this *Os Tincæ*, or *Uteri*, is in pregnant Women so strictly closed, except at the Time of Delivery, that it will scarce admit the End of the least Finger: in which State it continues till the true Time of Delivery approaches. When none of the true Labour-pains are felt, this Part continues shut: but if the Pains are genuine, it gradually dilates itself sufficient to admit several of the Fingers, the investing Membranes of the Fœtus at the same Time protruding through the opening like a Bladder distended with Water, in which some Part of the Fœtus may be frequently perceived by the Fingers; which is therefore a certain Sign of a speedy Delivery, and the more so, as the *Os Uteri* is more dilated. But, in order to examine the State of the *Os Uteri*, it will be necessary for the Surgeon or Midwife to pass their Middle-finger dipt in Oil into the Patient's Vagina. See *Tab. XXXIII. Fig. 1.* and gradually insinuating it into the Uterus, the Condition of its Mouth may be perceived, and the Time of Delivery thereby known either to be at hand or not. By the same Means may be also perceived whether the Uterus inclines to either Side, or is disposed directly in the Middle, which last is a Sign of a happy Delivery; as also whether the Head, Foot, Hand, or other Part of the Fœtus presents itself: from whence may be drawn a reasonable Prognostic, whether the Birth will be easy or difficult, as DEVENTER, a *Dutch* Physician, and VAN HOORN, with WIDEMANNUS, have

The *Os Uteri* should be examined.

well described in their Books of Midwifery. But without this Touch nothing certain can be determined. There is one Circumstance to be observed in examining by the Touch, and that is to do it when the Pains are remiss, and to cease when the Pains come on again till they are past: and thus the Midwife may be satisfied of every particular Circumstance.

Posture of
the *Fœtus*
in Delivery.

VII. This being premised, when a Physician or Surgeon is called to a Woman in Labour, their first Business is to make a diligent Enquiry of the Midwife, in what Posture the Infant presents itself in the Womb, whether its Position be natural, or preternatural. The most natural and convenient Posture is judged to be, when the *Fœtus* presents with its Head downward, and its Face backward towards the Rectum, its Occiput towards the Bladder, its Feet upwards towards the Uterus, and its Vertex or Bregma in the Middle of the *Os Uteri*, as in *Tab. XXXIII. Fig. 2.* All other Positions are accounted unusual or unnatural. But there still remain two Postures, which may be in some Measure esteemed natural, or at least they cannot be termed preternatural, since the Infant may be thereby delivered alive, and with no great Difficulty. One of these is, when the Feet of the Infant present themselves foremost, and then the Birth is termed *Agrippi*, see *Fig. 3.* The other is, when the Hips or Nates present themselves to the Mouth of the Vagina, so that the Infant is obliged to be drawn out with its Body in an inflected and unnatural Posture, as in *Fig. 4.* But every Birth does not succeed well, in which the Child presents itself in the last Posture: for if the Infant be not quickly delivered by a prudent Midwife, or Surgeon, but remains some Time in the Passage, it must, from the violent Stricture of the Parts and Navel-string, inevitably perish, even in the Birth. But when the Feet present themselves first, the Infant may be then not only preserved alive, but also delivered with much more Ease, especially when in the Hands of a prudent Midwife, or Surgeon. And, to say the Truth, when other Circumstances agree, this Posture may be esteemed the best and most convenient of any for the Midwife, because in that the Mother may be assisted more conveniently, as we shall hereafter declare more at large. If the Infant lies in any other Posture, as it may in a great many, which are very dangerous, some of which we have represented in *Fig. 5, 6, 7, 8, 9, 10, 11, 12.* the Birth is then not only difficult but impracticable: and the Mother and Infant are both in Danger, if the latter be not turned into a convenient Posture, and then delivered by some prudent Surgeon or Midwife.

Manage-
ment of the
Infant pre-
senting in a
natural Po-
sition.

VIII. If the Foot or Hand of the Infant does not present, so as to indicate to the Midwife its Position in the Womb, a Search is to be made, either with the Finger as we have before directed, or, if the *Os Uteri* be sufficiently open, by passing the whole Hand ^a cautiously into the Uterus, when the Pains are off, or at least very remiss, without which a Person may be greatly deceived. If the Head ^b of the Infant presents to the Mouth of the Uterus (which ought to be well known and distinguished by the Midwife from the other Parts of the Body, as the Nates, Knees, Shoulders, &c.) and its Body appears either by passing the Hand, or by the Touch to be properly disposed; and not-

^a A small and slender Hand is most commodious for this Office.

^b The Unskilful often mistake the Shoulder, Knee, Elbow, &c. for the Head, to the Injury both of the Mother and Infant.

withstanding

withstanding the Birth does not well succeed, we may then reasonably conjecture that there is something amiss, either in the Mother or the Fœtus: in the first, through Fulness of Blood, Weakness, Straitness of the Parts, either by a Contraction or Tumor, an oblique Position, or other Defect: in the Fœtus, when its Head is of an unusual Size, or its Body inconveniently placed, presenting either the Chin, Face, Ears, Occiput, Shoulders, Arms, Breast, Back, or other improper Part. If the Strength and Labour-pains of the Mother are deficient, and the Birth does not succeed, the Fœtus being at the same Time in a convenient Posture, either from the Largeness of its Head, or Narrowness of the Passage, it will then be altogether necessary to assist the Mother in her Labour, by administering proper Aliments and strengthening Medicines, and then to pass the Hand, first anointed with Oil, into the Vagina, in order gradually to dilate the Parts, and press back the *Os coccyx* strongly at the instant when the Pains and Throws of the Mother exert themselves, by which means the Delivery proves often happily successful. But if any other Impediment should be still remaining, it should be also removed in course, as if there be a too great Redundancy of Blood, a Vein should be opened. If the Passages should be too narrow, as they frequently are in the first Childbirth, or if they are too dry in those who are advanced in Years, it may then be proper to lubricate them with Butter, Oil, or other emollient Substances, and then to dilate the Parts with the Hands and Fingers, as we shall presently declare more at large^a. If the Vagina should be obstructed by some Membrane, it may be removed by proper Instruments in the Manner we have directed at *Chap. CXLVI. & seq.* If the Parts should be so much swelled as to deny a Passage to the Fœtus, they should be fomented with discutient Cataplasms, or Decoctions *ex flor. Chamomelæ Verbasci Sambuci & fol. Altheæ, Malvæ, &c* boiled in Milk, and applied warm. If the Passage of the Vagina should be obstructed by any Tumor, large Fungus, or fleshy Excrescence, it may be proper to extirpate the same, as we have directed in *Chapter CXLIX.* Lastly, if the Passage still remains too narrow, either from a Callosity, or Adhesion of the *Os Uteri* and Vagina, or the like; or if the Uterus should be burst, and the Fœtus pressed into the Cavity of the Abdomen, there then remains but one and a severe Method of extracting the Fœtus, *viz.* by the *Cæsarean* Section, concerning which we have treated at large in *Chapter CXIII.* But if none of these Obstacles appear, and the Birth does not succeed, from the Parts being too narrow, notwithstanding the Infant lies in a proper Posture, and is assisted by the Mother's Throws; in that Case the Patient is to be first laid in a proper Manner upon a Bed, with her Hips raised somewhat higher than her Head, or she may be placed in the Chair at *Tab. XXXIII. Fig. 15.* Then, after discharging her Urine, the Midwife is to pass her Hand, lubricated with some Ointment, Oil, or other fat Substance, into the Vagina^b, and therewith gradually to dilate the Parts, and press back the *Os coccyx* more especially at the Instant of the Mother's Pains and Throws; by which means the Head will by

^a We have a remarkable Instance given us by VOLTERUS (*de Art. Obstet.* p. m. 112.) of a Woman, whose Passages were so narrow, that out of seven Births, not one succeeded, but the Fœtus was obliged to be extracted in Pieces. More Instances occur in medical Writers.

^b It is to be observed, that the Labour-pains are seldom absent, when the Hand is thus introduced into the Womb, where its Stimulus is usually sufficient to excite them.

Degrees follow the Hand, which may lay hold of it, if possible, and draw it gently out: Or if its Body presents in an oblique or preternatural Position, (as in *Tab. XXXIII. Fig. 8 & 9.*) Endeavours are then to be used to turn it into its natural and easy Posture with the Hand, not neglecting at the same Time to administer strengthening Medicines to the Patient internally, to excite the Birth when it is impeded by the Absence of her Labour-pains. But if the Fœtus cannot be easily turned into its natural Position, the Feet are then to be taken hold of, and drawn out with the rest of the Body. If the Membranes including the Fœtus are too tough and strong to break of their own accord, so that they impede the Birth, notwithstanding the Mouth of the Uterus is sufficiently open, and the Head of the Infant may be felt through them, the Midwife may then venture to divide or lacerate the Membranes, either with her Fingers ends or a Hook. But Care should be taken not to break them 'till the *Os Uteri* is sufficiently dilated: otherwise the Birth will be thereby rendered extremely difficult. For the rest, it is always adviseable to abstain from the Use of Instruments in difficult Labours as long as the Infant continues alive, and the Mother in full Vigour: otherwise there is Danger of wounding and maiming, if not killing one of them. But if the Mother's Strength fails her, and the preceding Symptoms of Death approach, or may be shortly expected, the Fœtus should then be timely extracted, by the Feet; or, when that is impracticable, by lessening it with Instruments, in order to preserve the Mother: for it is much better to endeavour by this Means to preserve one, or both, than by too long Delays to lose both.

Admonition
for this Pos-
ture of the
Fœtus.

IX. It may be of Consequence to observe in this Place, that though the Head of the Infant presenting to the Mouth of the Uterus is generally esteemed the most natural Position; yet it sometimes happens from the fore-mentioned Causes, and especially from an oblique Situation of the Uterus, that not the Vertex of the Head, but rather its Sides, the Face, Ears or Occiput, correspond to the Center of the Vagina as in *Fig. 8 & 9*: by which Means the Birth is frequently rendered so difficult, as not to give way, either to the Endeavours of the Mother, or all the Assurances of Art. The Generality accuse Largeness of the Child's Head, but unjustly; since that is frequently observed to be no larger than usual, and is often actually passed through the narrow Mouth of the Uterus. But the most common Cause of this Difficulty, is rather the Shoulders of the Fœtus resisting against the Bones of the Pelvis; especially when the Head presents side-ways, as it is too slippery and round to be held fast by the Hands, its Extraction becomes thereby impracticable, and, being compressed by the Stricture of the Parts, it must inevitably perish in a little Time. Therefore when the Head presents in this Position, it is rather feared, than approved of as a good Sign by the most expert Midwives, who therefore chuse to alter its Position; for, in this Case, there is no passing of the Hand into the Uterus to turn the Infant, its Head being so closely wedged in between the Mouth of the Uterus and Sides of the Vagina; so that frequently no Assistance can be administered either to the Mother or Fœtus, but either one, or both, must be inevitably lost. See *Chap. CXIII. of the Cæsarean Section*, as also *DEVENTER, HOORNIUS, LA MOTTE, CHAPMAN, MANNINGHAM*, and others.

X. In

X. In this Difficulty PALFYN, to avoid injuring the Fœtus with Hooks, or other rough Instruments, has contrived a kind of broad and double Scoop without any Edge; which, being flat, he applies to each Side of the Head, and thereby endeavours to extract the Fœtus without lacerating or wounding any Part of it. See the Figure of this Instrument, *Tab. XXXIII. Fig. 16.* but the Size of this Instrument, which was sent me by the Author, is as large again as the Figure^a. This Instrument he would have applied, when the Fœtus is yet alive, or at least when we are not certain of its Death. But the Generality of Infants, who have had their Heads compressed in this Manner, are thereby so much weakened, and their vital Functions so much destroyed, that they may be looked upon as dead, and may be therefore extracted with Hooks by the common Method. I have indeed used this Instrument of my friend PALFYN, but without Success: for if you compress the Head with it but gently, the Fœtus is held too firm to give way to it; and if you press it too strongly, there is Danger of wounding its tender Head. I therefore endeavoured to amend the Instrument, by joining its two Parts together with a Hinge: but even then it did not answer Expectation^b. In this deplorable Situation of the Fœtus we have therefore no Remedy left but the *Cæsarean* Section, or to extract the Fœtus either dead or alive with Hooks (represented *Tab. XXXIII. Fig. 17* and *18.*) or other Instruments, to preserve the Life of the Mother. However, we shall hereafter propose, at § 20 and 21, some Artifices which may be of Service in Cases of this Nature.

PALFYN's
Method of
operating.

XI. If the Infant should be disposed in any other unnatural Posture, like those represented in *Fig. 5, 6, 7, 8, 9, 10, 11, 12.* if it be not changed or turned by the Hands of a dextrous Midwife, it will be hardly possible for the Birth to succeed; but the Life both of the Mother and Fœtus will be in the utmost Danger. In that Case the Administration of forcing Medicines to excite the Birth, will be highly pernicious, by spending the Mother's Strength before it is requisite, or killing the Fœtus by a too violent Compression of the Womb, by exciting a profuse Flooding; or, lastly, by causing a Rupture or Gangrene, if not other malignant Symptoms. Therefore nothing is more necessary in this Case, than dextrously to turn the Child into a proper Posture by the Hand first dipt in Oil, and then to extract it so soon as possible. We are furnished with many Artifices by Authors for turning and extracting the Fœtus: but not a few of them are either impracticable or pernicious. For there seems to be no more certain Way of inverting the Child in the Womb, and of extracting it, than by prudently introducing the Hand, after it has been oiled, into the Uterus; (See *Tab. XXXIII. Fig. 6, 10, and 11.*) and having laid hold of the Feet, the Infant is to be thereby gradually and cautiously extracted. And this we lay down as a general Rule to be observed, whenever the Infant presents in an unnatural Posture, except when the Head presents very nearly in its right Posture, or at least may be very easily altered into it. Nor is any other

Manage-
ment when
the Infant's
Position is
unnatural.

^a This I am told by my Friend, who communicated this Instrument of PALFYN's to me.

^b Yet this gave the hint to some other Surgeons, and particularly the *English*, to contrive a further Amendment of this Instrument; which is now called the *English* Forceps. See *Plate XXXIX. Fig. 10.*

Method practicable, which we are directed to by some ancient, but less experienced Practitioners, I mean, to turn the Child into its natural Position; when it cannot be laid hold of in so small a Compass, the Uterus not only contracting itself to a very great Degree: but the Roundness and Lubricity of the Head, are Obstacles not to be surpassed. Besides, there would be great Danger of compressing and injuring the Brain, Eyes, and other Parts of the Head, by so great a Force as must be required to turn the Infant by that Part. Therefore the Advice of those is not to be followed, who direct the Infant to be turned into its natural Posture, in whatever Manner it presents in the Womb. LA MOTTE agrees with me, that though the Head of the Fœtus may be turned to its natural Position, yet it is often more adviseable to extract it by the Feet; since the whole may be done in less Time than the Head can be inverted, by which means the Mother may be sooner delivered, and the Infant more likely to be live-born. Even when the Head has been, after much Trouble, in this Manner reduced into the desired Posture, the Delivery is not completed, but Nature must perform her Part, and the Patient has in a Manner all her Pains and Throws to go through again. And if she should be weak, or otherwise incapable, the Feet of the Infant must be again after all searched for, and thus extracted; tho' perhaps it may not be possible, or at least not so easy again to pass the Hand through the Mouth of the Uterus, now obstructed by the Head of the Infant. So that by thus delaying, the life of the Fœtus is either lost in the mean Time, or in its Extraction; and the Mother suffers much more than she need to have done, frequently expiring soon after: or else the Fœtus must be extracted by Instruments, as the last remedy to save the Mother. It is therefore in my Opinion highly preferable to extract the Infant at first by the Feet, rather than to lose Time, and perhaps miscarry in the Operation, by endeavouring to turn its Head into the natural Posture for Delivery.

When the
Fœtus is to
be turned.

XII. Before we proceed to give particular Directions for inverting the Infant in the Womb, and extracting it, it will be first proper to declare in what Cases it is highly necessary thus to turn and to extract the Infant by its Feet. This Inversion and Extraction is to be therefore performed, 1. Whenever any other Part of the Infant presents besides the Vertex of the Head with its Face towards the Rectum. See *Tab. XXXIII. Fig. 5* to 12. 2. In all Cases in which some other Part of the Infant comes out of the Uterus besides its Head; and particularly when the Hand or Navel-string appears in that Manner, and the Midwife cannot return it without its being excluded, again as before, by the succeeding Throws of the Mother. 3. Whenever the Head presents itself sideways with the Ears, Face, Chin, or Occiput towards the Mouth of the Uterus, being wedged in so as not to be turned without much Difficulty, as may be seen in *Fig. 8* and 9. 4. Whenever the Back, Belly, or Side of the Infant presents, as in *Fig. 5* and 7. 5. When the Infant is even in its natural Position, but the Birth does not succeed, and there is Danger of losing the Life either of the Fœtus or Mother by Delay; as when her Strength fails her, a violent Flooding ensues, or when she is seized with Convulsions or epileptic Fits. In all these Cases there is great Danger of losing both the Mother and Fœtus, if the latter be not timely extracted by the Feet; which should be performed by passing the Hand under the Face and Breast of the Infant down to its Feet.

6. When-

6. Whenever the Navel-string slips out of the Uterus before the Head of the Fœtus: for if it be not then immediately extracted, the Circulation being intercepted between the Mother and the Infant, by compressing the umbilical Cord, will be attended with the certain Death of the latter. And, lastly, 7. we may add, whenever the Uterus is obliquely situated, notwithstanding the Fœtus presents in its natural Posture: for it is generally much easier in those Cases to extract the Infant by its Feet, than to alter the Position of the Uterus from an oblique to a straight Direction. Therefore in all these, and such like Cases, where Delay is dangerous, it is better in this Manner to hasten the Delivery, than to slip the critical Opportunity, as DEVENTER, and others, whom we quoted in the VIIIth Section of this Chapter, have largely demonstrated.

XIII. Among the innumerable preternatural Positions, in which the Infant presents, we meet with none more frequent and dangerous, than when its Hand or Arm first appears, as in *Fig. 11.* which Position we shall therefore first consider. If the Hand of the Infant is perceived through the Membranes at the Mouth of the Uterus before the Waters are discharged, it frequently withdraws that Part, of itself, if the Midwife pinches or hurts its Fingers, and turns its Head in the room of it, whereupon the natural Birth succeeds^a; or perhaps in this Case it presents its Feet. But if the Waters are already discharged, it will signify nothing to pinch the Fingers, because the Uterus is then so closely contracted, that its Hand is immoveable. The Generality of Practitioners advise in this Case, to return the Arm or Hand into the Womb, and present its Head, after which they are to commit the rest to Nature. But as there is great Danger in waiting in that Manner, it is in my Opinion much better to extract the Infant as soon as possible by its Feet. For if the Arm comes first, the Infant lying cross with its Head on one Side, and its Heels on the other, it must be impossible for the rest of the Body to follow the Hand of the Extractor: it is even generally much easier to pull off the Arm, than thereby to extract the rest of the Body, except the Fœtus be imperfect, or else very small; and then I have seen it sometimes this way extracted. In this difficult Case the Midwife ought, without Delay, to pass her Hand and Arm lubricated with Oil, into the Uterus, even up to her Elbow, when it is necessary, as in *Fig. 10* and *11.* and taking hold of the Feet, the Infant is to be thereby inverted and extracted, without staying to replace its Arm, or remove its Head, which cannot be done without some Difficulty, especially when it has been a considerable Time in that Posture. Whoever prudently considers this dangerous and difficult Presentation of the Fœtus, and is also acquainted with the Structure and Position of the Uterus, and Bones of the Pelvis, will readily conceive in what Manner the Infant is to be turned, when it presents in other Postures. I need only advise them to take Notice, that when they pass the Hand into the Uterus, they ought to press it against that Part of the Vagina next the Rectum: otherwise they will meet with a Resistance from the *Os Pubis*.

Especially
when the
Hand or
Foot ap-
pears.

^a This is an Observation of SIGISMUNDA, Midwife of Brandenburg, after whom it has been taken Notice of by DEVENTER, and other Writers.

This Posture
further con-
sidered.

XIV. Since we have proposed this Posture of the Fœtus as an Example, whereby the Midwife may know how to treat it when in others, we shall consider it a little more at large. And first, a convenient Posture in the Patient is of no small Importance, in order to procure an easy Delivery^a. The Mother may be therefore most advantageously placed in a Chair for this Purpose, having a moveable Back, which may be elevated or depressed at Pleasure, while the Patient's Back is supported by it, as on a Bed; see *Tab. XXXIII. Fig. 15*. Or, when that is not at hand, she may be laid across a Bed, Couch, or Table, or upon four common Chairs placed opposite to each other, which, being covered with Cloaths and Pillows, the Patient may be laid on them, with her Hips elevated a little higher than her Head, according to CÆLUS, and the Parts conveniently disposed for the Midwife to perform her Office. This done, the next Business is to enquire which Hand of the Infant presents, that thereby a Judgment may be formed in what Manner the rest of its Body lies in the Uterus. And if from this Consideration it appears, that the Feet of the Infant lie on the left Side of the Abdomen, as in *Fig. 11*. in that Case the right Hand of the Midwife, being lubricated with Oil, should be gently passed into the Uterus, pressing aside the Head and Hand of the Infant, to make way for the rest of the Arm; then turning it gently towards the Legs and Thighs, and afterwards endeavouring to lay hold of and extract the Feet of the Infant. And this should be performed with the more Slowness and Caution as the Feet are very often separated from each other, and stretched upwards: but when the Case has not been long delayed, nor the Uterus much contracted, the Feet being as yet pretty near together, there is then generally no great Difficulty in apprehending, and extracting the Feet in this Manner. If the Feet are not in this Manner laid hold of, all other Endeavours will prove fruitless; and the Uterus contracts itself so strongly, as scarce to admit the Hand for this Purpose, which generally requires it to be passed up to the Elbow, as in *Fig. 10* and *11*. If the Hand of the Midwife should fail or be tired by too long searching, it may be then drawn out, and after some Respite introduced again, or the other used instead of it, to search for the Feet: when found, they are to be gently extracted, and the Infant thereby turned and drawn out, but not upward, nor in a strait Line, but downward and backward, because the Angle of the *Os Pubis* is that way largest. If only one of the Feet can be found, it may be carefully drawn a little way out of the Uterus, and secured with broad Tape from being drawn in again. Then the Midwife passes her Hand, as represented in *Fig. 12*. in order to take hold of the other Foot; which, being gently drawn out like the other, both of them are then to be wrapt up in a warm linen or woollen Cloth, because of their Lubricity, that they may be more firmly held, in order to make a gradual Extraction of the Infant, which should be in a prone Posture. But if the Hand cannot reach the End of the Foot, either from a Stricture of the Uterus, or other Cause, in that Case I take hold of the Leg, and thereby turn the Fœtus, and draw its Knee to the *Os Uteri*, and thereby the Foot, and then by both of them I deliver the Fœtus as before.

^a Upon this Subject it may be worth while to consult a Dissertation, *De Partu difficili ex Infantis Brachio prodeunte, sub WEDELII præsidio*. Jenæ 1732.

XV. If the Infant appears to lie in a supine Posture, in extracting it, as in *Fig. 3.* when the Legs have been drawn out as far as the Abdomen, it should be dextrously turned upon its Belly^a, by taking hold of the Hips: otherwise there will be Danger of the Chin sticking against the *Os Pubis*, and of the *Uterus* contracting itself about the Neck of the Infant, so as to kill it, as it frequently happens with base and imprudent Midwives: but when the Infant can be easily turned upon its Abdomen, the Birth generally proves easy. However, it should be observed which Side will be most convenient to turn it upon; for on one Side it may succeed very happily, whereas in turning it on the other, you are in Danger of twisting the Neck of the Foetus: and, in extracting it, it will be better to draw it out, by turning in a spiral, than in a straight Direction. But if it has been drawn out as far as the Abdomen, and we are then unwilling to turn it, the Hand is to be passed into the Uterus under the Arch of the *Os Pubis* upon the Abdomen of the Infant, that while it is extracted by one Hand, its Face and other Parts may be prevented from being injured by the *Os Pubis* with the other. To return the Arm of the Infant into the Uterus, when prolapsed before its Extraction, as some advise, is not only useless or unnecessary, but very often dangerous and impracticable. If the Feet of the Infant are turned towards the right Side of the Mother's Womb, they may be most commodiously searched for and extracted with the left Hand. But it should be observed, that there is some Reason for passing the Hand to the Extremity of the Thigh, when one Leg is extracted, and the other searched for, to see that they belong to one Infant, lest there should be Twins, and, by extracting two Legs of different Infants, both of them might be greatly injured^b. The Methods, which we have hitherto proposed, will generally prove sufficient in the Hand of a prudent Midwife for most preternatural Births: For if the Head does not directly present in its right Position beforementioned in § VII. the Feet are to be then searched for, and extracted in the Manner here proposed without Delay; by which Means the Birth generally succeeds happily both to the Mother and Infant. But if it be delayed till the Uterus has so violently contracted itself, as hardly to admit the Hand, and allow Room for it to move, it renders the Case extremely dangerous for both, and particularly the Infant; and therefore it will be most prudent to compleat the Operation as soon as possible.

Some Observations and Cautions.

XVI. From what has been now said, the following Observations may be made. 1. If the Infant's Feet present, or come out of the Uterus, as in *Fig. 3.* they ought not to be returned, much less ought the Head of the Infant to be inverted in the room of them, as many have formerly directed: but, on the contrary, the Feet should be taken hold of, and extracted as soon as may be

Rules or Directions from the preceding.

^a The Generality of the Moderns advise the turning of the Infant in this Manner upon its Abdomen; but the experienced HOORN asks, with good Reason, whether it may not, in many Cases, be better to free the Head, and other Parts of the Infant, from the Arch of the *Os Pubis* without turning it, in the Manner we shall presently direct; because that Method often twists, or distorts the Neck of the Infant, and generally gives the Midwife more Trouble than freeing its Head, as before. See HOORN. *Obs.* 26.

^b LA MORTE, and the rest of the modern Writers, think this Caution useless and ridiculous; because, say they, Twins are not included in one common, but each in its distinct Membrane; and therefore the Feet of one cannot be entangled with the Feet of the other: but they ought also to have considered, that the Membranes of each may be broke, and their Feet then entangled in the Birth, so as to render this Caution frequently, though not always, necessary to be observed.

with Conveniency, by which means the Birth will be much easier, even than when the Head presents, provided the Infant is extracted with its Face downward, as we have before directed. But it is generally better for Women, who are this way delivered to be laid upon a Bed, than in the Chair described for that Purpose. 2. If the Hand of the Infant presents together with one or both of the Feet, the latter are notwithstanding to be taken hold of and extracted according to the preceding Directions, gently pressing back the Hand at the same time. 3. If the Hand presents itself with the Nates, it is then also to be extracted in the same Method, if the Feet can be taken hold of; but if that cannot be conveniently done, the Nates may be extracted first, with the rest of the Body following, as in *Fig. 4.* 4. When one Foot is extracted, and the other cannot be found, the Buttock of the same Side presenting itself, indicates that the Leg is bent towards the Abdomen; which if so, the Infant may be drawn out by one Leg. 5. If the Fœtus cannot be turned with one Leg, when the other cannot be found, that Leg is to be brought to the Mouth of the Uterus, and secured with a Bandage, while the other is searched for; which when found, the Inversion may be safely performed. 6. If the Navel-string appear betwixt the Legs of the Fœtus while it is extracting by the Feet, the Operator should desist, and draw the Navel-string a little more out of the Uterus, so that it may make a Loop or Arch, through which the Legs are to be passed when bent, and after them the rest of the Body; by which means it may be cleared without any Danger. But if, on the contrary, the Navel-string is left between its Legs till the whole Infant is extracted, the Navel-string may be by that means lacerated, or broke off so near to the Abdomen, that it cannot be afterwards tied, of which Death may be the Consequence. 7. The Operator need not be solicitous about the Infant's Arms, when it is extracted by the Feet, because they generally follow the Body: and if one should endeavour to extract them by the Side of the Body before the Head, the Neck will by that Means be compressed by the contracted Mouth of the Uterus, and the Head will be also retained in such a Manner, as to occasion the Death of the Infant, if it be not prevented by some Artifice, which Accident does not happen when one or both of the Arms accompany the Neck. 8. When only one of the Feet presents itself, as in *Fig. 12.* it is not necessary to return it, and invert the Head of the Infant in the room of it; but notwithstanding the Infant should not be forcibly extracted by that one Leg alone: but it is better to search also for the other with the Hand, as in *Fig. 12.* and to draw out the Infant by both of them together. Yet when the other Leg is bent up towards the Abdomen, then the Infant may be sometimes extracted by one alone, as we have before observed.

When the
Infant's Na-
tes present
first.

XVII. When the Nates of the Infant present themselves foremost, as in *Fig. 4.* it may indeed be safely delivered that Way; but not without Difficulty, especially when the Passages are narrow. For when the Legs and Thighs are in this Manner complicated with the Body, there is great Danger of the Infant's being killed by the Violence of the Compression, as frequently happens when the Mother falls in Labour by herself, or else without the Assistance of a prudent Midwife: or at least, if the Infant be not killed, the Parts of the Mother will be lacerated, and greatly injured. And therefore if the Nates are not too far excluded

excluded to be conveniently returned, the Mother being laid down upon her Back with her Hips elevated, it may be proper to press them back gradually, and, proceeding from the Thigh to the Leg, to lay hold of the Foot which is nearest, and extract it, searching afterwards for the other Foot, that the Infant may be delivered by both of them: but if they cannot be thus conveniently extracted together, the Infant may be delivered by one of them. However, if the Nates are so far excluded, that they cannot be returned, or the Foot cannot be found, it will then be necessary to lay hold of the two Hips with each Hand, passing the Fingers, especially the first, into each Groin like a Hook, in order thereby to extract it, as at *Fig. 4.* and that without any Delay, lest it should be killed by the Compressure. And if the Infant in this Position should lie with its Face upwards after its Legs have been drawn out, it should be turned into a prone Posture, except the Operator is capable of freeing the Chin and Face from the Arch of the *Os Pubis* without being injured.

XVIII. When the Shoulders of the Infant are retained in the Uterus, its Head and Neck being excluded, the Business of the Midwife is then to pass her Fingers prudently under each Arm, and, by drawing them forward, the rest of the Body will follow without much Difficulty, especially if it be drawn backward towards the Rectum, where the Angle of the *Os Pubis* is largest; which is also a Circumstance to be observed in most other Cases. But, on the contrary, if the Fœtus presents with its Feet foremost, and its Exit is obstructed by the Arms or Shoulders, the Fingers are to be passed on one Side of the Infant, and one Arm thereby cautiously extracted, leaving in the other; and then the rest of the Body will easily follow, especially if the Fœtus is in a prone Posture, and gently turned from one Side to the other in its Extraction. The Arm left in the Uterus, is to prevent the Neck of the Infant from being too strongly compressed by the Mouth of the Uterus, which would otherwise retain the Head, and strangle the Infant. But it very often happens, that the Infant, which is extracted with the Feet foremost, if the Hand is not conveniently passed between its Face and the *Os Pubis*, will notwithstanding be caught by the Neck, from the Stricture of the *Os Uteri*, especially when its Face and Chin lie upwards. And if one should endeavour to force it out by Violence, they will sooner pull off the Head, than accomplish their Design, which they will be more likely to compleat, by passing the Hand over the Neck and Chin of the Infant, so as to prevent the Parts of its Face from catching against the *Os Pubis*, pressing it backwards towards the *Rectum* at the Time of its Extraction. A great many advise in this Position of the Infant, to pass the two Fore-fingers into its Mouth, in order to draw out the Head: but as by that Means the lower Jaw may be easily dislocated, broke, or pulled quite off, I think the preceding Method is much preferable. But if the Infant lies in a supine Posture, and its Chin is resisted by the Arch of the *Os Pubis*, so as not to be extricable by all the Artifices of the Midwife, in that Case *Van Hoor* thinks the Birth will succeed more easily, if an Assistant lifts up the Feet of the Infant, while it is drawn gently forward. The same Author also observes, that sometimes the Neck is twisted by endeavouring to turn round the Fœtus, when its Head is in this Manner fettered: and if this be the Case, the Hand is to be prudently introduced.

When the
Head or
Shoulders
stick by the
way.

troduced to free the Parts, as we before directed. If the Fœtus appears to be dead, it may be extracted in the same Manner, and with less Caution.

Directions
from the
foregoing.

XIX. We shall, for the sake of Beginners, here relate a few more Directions, which are deduced from what we have before advanced. As, 1. When any other Part but the Head is perceived by the Touch, (the Membranes remaining entire) such as the Foot, Hand, Knee, Navel-string, &c. in that Case the Membranes are to be opened, either with the Fingers, Nails, or an Instrument, and the Feet are to be searched for, and the Infant thereby extracted. 2. But if the Head lies almost in its natural Position, and may be easily reduced to it, it may be done by the Hand: otherwise it must be extracted immediately by the Feet. 3. When the Waters are discharged before the Midwife is called, Search is to be made after the Position of the Fœtus; and if the Head presents in its right Position, it may be concluded, that the Birth will shortly succeed: but if any other Part offers, it should be delivered by the Feet. 4. When the Chin, and Part of the Face, are obstructed by the *Os Pubis*, they are to be relieved by passing the right Hand betwixt them, pressing towards the Rectum, while the Passages are dilated, and the *Os coccyx* strongly pressed back with the left Hand. But if the Birth does not succeed after a short Time when the Waters have been discharged, and the Head presents in its natural, or any other Posture, the Feet are then to be searched for, and the Infant thereby extracted, especially when it is rendered still more necessary by the urgent Pains and Throws of the Mother. 5. When the Neck or Shoulder presents, the Head being inclined to one Side, as in *Tab. XXXIII. Fig. 8.* if the Shoulders cannot be removed, and the Head properly disposed, then also it is to be extracted by the Feet. 6. If the Head of the Fœtus presents in a prone Posture, with either of its Arms in the Vagina; in that Case the Midwife is to pass one Hand over the Mouth and Chin of the Fœtus, and the other under its Arm; and thus it may be often extracted by both Hands. But, 7. if both Hands cannot be brought through the Vagina, she is to endeavour to extract it by the Feet. 8. In all transverse Positions of the Fœtus, it should be extracted by the Feet. 9. When the Navel-string comes out with the Head, they are both of them to be speedily returned, or the Infant will perish: but if it slips out again, in all Positions of the Fœtus, it should be then extracted by the Feet without further Delay. 10. If the Fœtus presents in its natural Posture with the Navel-string about its Neck, the Case is not then so dangerous; but it may be untwisted, and the Fœtus afterwards extracted: otherwise, to prevent it from being broke, it may be cut in two near the Neck, and compressed by the Fingers of an Assistant till the Birth is over; when it may be secured with a Ligature. 11. When there are Twins, the Navel-string of one is to be first divided, and secured by Ligature so soon as it is delivered, and then of the other. But if the Waters are not yet discharged, we are not to wait till they break forth of themselves: for by such Delays, both the Mother and Fœtus are often in the highest Danger. And therefore it may be proper to divide the Membranes, and deliver the Infant, while the *Os Uteri* is relaxed, before any spasmodic Contraction of the *Uterus* comes on, which might render the Delivery then impracticable.

Difficulties
from the
bad Disposition
of the
Head and
Uterus.

XX. When the Vertex of the Infant's Head does not directly correspond to the Vagina, either before or soon after the Discharge of the Waters, but is inclined to either Side, or lies towards the *Os sacrum*, or *Os Pubis*, the Birth is then likely to be very dangerous, as we have before observed in § VIII. and IX. If
therefore

therefore the Midwife cannot conveniently reduce the Head of the Fœtus to its natural Position, when it is thus obliquely situated, and the Birth will not succeed, notwithstanding her Endeavours by pressing with one Hand upon the Abdomen of the Mother, and, by dilating the Parts, and pressing back the *Os coccyx* with the other, the Infant should then be immediately extracted by the Feet, as we have before directed; and this more especially, when a violent Flooding, or excruciating Pains, with fainting Fits, seize the Mother.

XXI. Lastly, it is not undeservedly reckoned one of the most difficult Cases, when the Head of the Fœtus descends so far into the Vagina as to be visible, and at the same Time is so strongly retained, that neither the Endeavours of the Mother, nor of the Midwife, can set it at Liberty. For in this Case the most prudent may be deceived in their Expectations of a happy Birth, from the Child presenting itself in a natural Position, as we have before observed at § IX, so that both the Mother and Fœtus may be lost, if the latter be not timely extracted, either by the Hands or Instruments. The Cause of this Difficulty is commonly attributed to the Largeness of the Infant's Head, but generally without Reason; because we find it has been small enough to pass through the narrow *Os Uteri*. I should rather imagine it to proceed from an oblique Situation of the *Os Uteri*, or from the Resistance which the Shoulders meet with against the *Os Pubis*, when the Infant presents Side-ways; which may be generally known by one of its Ears being upward, and the other downward. In this difficult Case there are two Methods to be followed: 1. By passing the two Fore-fingers of each Hand, at the Time when the Pains urge, in order to press back the Rectum and *Os coccyx*, that the Head may descend as low as possible; and then to pass all the four Fingers of each Hand about the Head, so as to lay hold of it, and, by dilating the Parts, at the same Time to free it as much as possible from the Stricture, till the Hands can pass behind the Ears and Occiput, so as to have sufficient Hold for extracting it. But sometimes this alone will not be sufficient: but it is also necessary to draw out one of the Arms, especially the lowermost, in order thereby to extract the Fœtus, and free it from the Resistance of the *Os Pubis*. 2. The other Method is, when the Rectum has been pressed back, as before, to pass the left Hand under the Head of the Fœtus, after it has been first lubricated with Oil, to grasp it as a Globe; then to pass the Fingers of the right Hand above the Head under the *Os Pubis*, endeavouring to extract it, pressing a little backward, and advising the Mother to exert her Strength at the same Time, as HOORN observes. The Head thus extracted, the Neck of the Fœtus may be then taken hold of by one Hand, and the Head drawn forward, by moving it from one Side to the other; while the Hand, which is under the Neck of the Fœtus, extracts the nearest Arm, and, by turning the Infant upon its Belly, drawing it gently forward at the same Time, it comes forth almost of itself. But when all these Methods prove fruitless, the Mother's Strength gradually decays, and her Life is threatened with the most malignant Symptoms, the Operator is then obliged to lay aside Compassion, and extract the Fœtus, whether dead or alive, by Instruments. This may be done, either 1. by opening the Head with an Incision-knife, or Pair of Scissars, and extracting the Brain with the Fingers or a Scoop, after which the Head collapsing, it may be more easily taken hold of and extracted, either by the Hand, a Pair of large Stone Forceps, or as DEVENTER advises, by binding a broad

Of the
most diffi-
cult and
dangerous
Births.

Tape.

Tape about its Neck behind the Head: which last Method, he asserts, will frequently succeed, without extracting the Brain. But if, notwithstanding the Extraction of the Brain, it does not come forward, the Shoulders are to be freed from the *Os Pubis*, and the Fœtus thereby extracted. 2. The Extraction may be made with a Hook represented in *Tab. XXXIII. Fig. 17* and *18*. in defect of which, in Case of Necessity, HOORN uses a large Nail, bent in form of a Hook, to which a Ligature is fastened, that it may be held and drawn with more Ease. Or, 3. it may be performed by the Instrument of MAURICEAU, which he describes, and calls *Tire-tête*: which is, however, in my Opinion, less commodious than the Hook of DEVENTER and HOORN. And almost in the same Manner is the Fœtus to be extracted, when it cannot be delivered by the Hands in many other Cases, which threaten the Life of the Mother, as in monstrous Births, where there are two Heads, &c.

Of the English Forceps.

XXII. But indeed all these Methods are calculated for the Preservation of the Mother rather than the Fœtus, as the *Cæsarean* Section respected the Fœtus rather than the Mother; and though they may be very proper for extracting dead Infants that are wedged in by the Head, yet if the Infant be alive, they generally destroy it. The wisest therefore of our modern Physicians and Surgeons have endeavoured to find out an Instrument, which might save both, and extract, if possible, the Fœtus alive. Among the rest, PALFYN, as I before observed *Sect. X.* contrived a kind of flat Hooks, without any Edge, for this Purpose; which you will find represented in *Plate XXXIII. Fig. 16*. by means of which the compressed Head of the Fœtus might be easier extracted without lacerating or wounding. But as I found by Experience, that those were insufficient, especially where the Head was very closely locked in; nor did they retain it firmly, on account of its Lubricity; I therefore judged it expedient to contrive some Method of joining the Hooks together to give them a greater Force. Hereupon many Surgeons were set to Work, to improve this Instrument; and connected the Hooks by Means of a Ligament, or by a Hinge in the Form of a Forceps: by which they extracted not only dead, but the living Fœtus with Success, though strongly wedged in by the Head; as CHAPMAN, GIFFARD and BÖEHMER testify in their Writings on the Practice of Midwifery. But when the Fœtus is known to be certainly dead, I prefer my common Hooks (*Fig. 16* and *17.*) to the *English* Forceps: for the Forceps are so large, that they strike a great Terror not only into the poor Patient but the Standers-by. Whereas my Hooks are so small, that they may be easily concealed; and I have often extracted a Fœtus with them, when scarce any body has known that I have used a Hook, and have thought that I performed it by my Hands only. On this Account, CHAPMAN, who is otherwise a professed Enemy to the common Hooks, yet prefers them to the Forceps for the Extraction of a dead Fœtus; and more particularly, as they often effect it in the shortest Time.

C H A P. CLIII.

Method of extracting a dead Fœtus.

I. **W**HEN the Fœtus dies in the Birth, and presents in an ill Posture, the excessive Disorder which it gives the Mother, makes it altogether necessary to free her from it, either by the Hands or Instruments. Nor does the Difficulty proceed altogether from the still Birth, though it even be in a natural Position: but it proceeds in part from the Mother's Weakness, or from her feeling few or no Pains, from there being no Motion in the Infant, whose Struglings, when alive, usually prove a strong Incentive to forward the Birth; and partly also from the Contraction of the *Os Uteri* and *Vagina* after the Time of its Relaxation has been neglected. But before the Midwife proceeds to the Extraction, it is first highly necessary to be assured, whether the Infant is absolutely dead or alive, that it may not be ignorantly killed in the Operation. And this is the more necessary, because the Generality of Signs, which are usually proposed to distinguish, whether it be dead or alive in the Uterus, are uncertain and fallacious, especially when the Fœtus presents either its Shoulders, Buttocks, Back, or either Side of its Head, to the *Os Uteri*; because those Parts afford very obscure and uncertain Signs, whether it be alive or dead.

Extraction
of a dead
Fœtus often
necessary:

II. The principal Signs of the Fœtus being dead are the following: 1. If the Mother feels no Motion in the Fœtus some Time after she has left her Labour-pains, but rather a heavy and sluggish Weight in her Belly, which shifts to that Side on which she turns herself. 2. If she is seized with Shiverings, fainting Fits, and a Tenesmus. 3. If her Breath stinks violently; and, 4. When Matter of a cadaverous Smell flows out of the Uterus. 5. The Abdomen at the same Time seeming cold to the Touch. Another Sign, which is looked upon by some as an infallible Indication of a dead Fœtus is, when the Meconium, or black Fæces of it, are discharged through the Vagina: though I must acknowledge, that I have frequently observed this last Appearance when the Fœtus has not been dead. And, to say the Truth freely, I have been induced, by all the preceding Signs, to believe the Infant dead, and to extract it as such, when I have been afterwards convinced that it was alive. It is therefore, in my Opinion, a more manifest and certain Indication of a dead Fœtus, when the Navel-string or Placenta, being touched, (when that is practicable) appear cold, and without any Pulsation of the Arteries; as also when there can be no Pulse felt in the Carpus and Ankle, and especially if the Cuticle easily peels off at the same Time: and, lastly, it is a pretty sure Sign of its being dead, if no Pulsation can be felt in the Bregma or Fontanel, when it presents in its natural Posture, appearing rather depressed and flacid, than throbbing to the Touch. However, we should be cautious not immediately to imagine, that the Fœtus, which is without this Pulsation in the Fontanel and Arteries, is therefore dead; for the Motion in those Parts is sometimes so small in weak Infants, as to be imperceptible to the Finger. Indeed the Sign taken from the peeling off of the Cuticle is more certain. If, therefore, the Infant appears to be really

Signs of a
dead Fœtus.

dead, and the Waters are already discharged, it should be extracted with all possible Expedition, lest, by its Putrefaction in the Womb, it might occasion a most malignant Fever, and even the Death of the Mother. But if the Fœtus dies before its true Time of Birth, the Waters not being discharged, (which is indicated by the Motion of the Fœtus gradually lessening, and the Swelling of the Belly subsiding) it may, in that Case, remain in the Uterus without putrifying for the space of several Weeks, or even Months; of which I had formerly an Instance^a. And therefore, if the Patient is well in all other Respects, it may be better to wait till we have some Call from Nature, than to procure an untimely Exclusion of it, either by Medicines, the Hands, or Instruments.

When the
dead Fœtus
presents it-
self rightly.

III. If the Infant dies in the Birth, and at the same Time presents in a natural Position, we are not immediately to fall to work upon it with Instruments, before we are certain of its Decease; but the Mother should be assisted in her Endeavours, to exclude it naturally by proper Medicines, particularly strong Clysters, which are frequently very serviceable in promoting the Throws of the Mother, and the Exclusion of the Fœtus. We must be very cautious at the same Time not to be too free with these warm and forcing Medicines, lest we thereby bring on either a violent Fever, or a dangerous Hæmorrhage. But if these prove insufficient, it may be extracted by the Hands^b before it begins to putrify. That the Operator may then succeed the better, the Mother should first void her Urine as if the Fœtus was alive: but if she cannot of herself make water, because the Head of the Infant compresses the Neck of her Bladder, it should then be drawn off by the Catheter represented in *Tab. XXVII. Fig. 1.* to 5: which done, she may be placed either in the Chair, *Tab. XXXIII. Fig. 15.* or else upon a Bed, as we have before directed in § VIII, and XIV. of the preceding Chapter. After which, the Infant is to be extracted, by applying both Hands to its Head, or else by the Feet, as we have described in the foregoing Chapter. It may be also not amiss to attempt its Extraction by passing a broad Ligature about its Neck, as DEVENTER advises before the Application of Hooks, which are less safe. If this does not succeed, we may try either PALFYN's Hooks, Plate XXXIII. *Fig. 16.* or the *English Forceps*, Plate XXXIX. These Forceps must first be disjoined at the Hinge, and each of them applied cautiously to each Side of the Head, to compress it gently, and then extract it. The Hooks proper for this Purpose should be well polished; Figures of which have been given by several Authors, and may be seen in *Tab. XXXIII. Fig. 17, 18, and 21.* These are to be prudently fastened into some convenient Part of the Infant's Head, as the Eye, Ear, Mouth, and sometimes the Forehead and Occiput together, thereby extracting the Fœtus downward against the Rectum: and, if those Instruments are not at Hand, a large Nail may be bent into a Hook, and applied as we observed in Sect. XXI. of the preceding

^a I remember a Case of this Nature, in which the Mother retained a dead Fœtus for two whole Months without any Detriment, till at length she fell in Labour, and discharged her Burthen without any Difficulty. More such Instances occur in Authors.

^b That this is one of the most antient Operations, may appear from HIPPOCRATES's Book, *de Morb. Mulier.* and especially from his professed Treatise *de Fœtus Extractione*. See FONTANI *Libellus de Fœtus Extractione per Uncum.*

Chapter. But CELSUS, who, in my Opinion, seems to have been well versed in these Matters, prudently advises not to extract the Fœtus at any Time indiscriminately: for, says he, “if it be attempted when the Parts are contracted so as not to give way to the Fœtus, the latter will be not only pulled to pieces, but the Parts themselves will be also injured by the Point of the Hook;” and therefore when the Parts are contracted, that is, when the Pains cease, the Operator should desist, and repeat his Extraction when they come on again.” Lastly, CELSUS directs the Hook to be drawn with the right Hand, while the left guides it, and holds the Fœtus. But if the Infant’s Head is so large, or obliquely situated, that it cannot be drawn through the Vagina whole, an Opening may then be made in the Fontanel, or other Part of the Head, and the Brain thereby extracted, that the remaining Part may collapse, and be more easily extracted by one or both Hands. The celebrated Professor of Midwifery, MAURICEAU, in his Treatise upon that Subject, furnishes us with a particular Instrument both for opening and holding the Head, which he calls *Tire-tête*, and highly extolls it, as having frequently experienced the Advantage of it. But this complex Instrument is, in my Opinion, not so very necessary, as the Business may be easily performed by the simple Hooks represented *Fig. 17* and *18*. or else when the Brain is extracted, it may be very well drawn out, even by a crooked Nail, or the Hand only.

IV. But if the dead Fœtus presents in an unnatural Position, we are then to turn it, and extract it by the Feet as CELSUS has advised: and this much in the same Manner as we have before directed for unnatural Postures of the live Infant; but with a little more Caution, especially if the Fœtus is begun to putrify, lest it should be pulled to pieces, and the Head left behind in the Uterus, which cannot then be easily extracted, because the *Os Uteri* contracts itself. For if it is retained, and putrified in the Uterus, it excites the most malignant Symptoms, and frequently even kills the Mother, if it be not speedily extracted.

When the dead Fœtus lies in an unnatural Posture.

V. As the Head is not easily extracted, both upon the Account of its round Figure and Lubricity slipping through the Fingers, it may be adviseable, when the Head is thus left behind, to attempt its Extraction by thrusting the Finger into the Mouth, or the *Foramen magnum* of the *Os occipitale*; by which means I myself happily extracted the Head of an Infant without Instruments. But if the Fingers are not sufficient for this Office, a Piece of Linen may be passed into the Uterus, about an Ell long, and four Fingers Breadth, which being passed round the Head, and fastened into a Loop for the Hand, the Extraction may be thereby made very commodiously. Others recommend an Instrument for this Purpose, which is to be fixed into the Mouth, Nose, Occiput, or other Part, passing the left Hand into the Vagina to guide the Hook, and to prevent it from injuring the Parts; as we before observed from CELSUS in Sect. III. But notwithstanding, if it proves too large to be drawn out by these Means, it may be then opened, the Brain extracted, and the remainder performed either by the Hands alone or proper Instruments. The large Forceps for extracting the Stone from the Bladder, or that described in Plate XXXIX may be very serviceable here. The celebrated AMYAND in this Case uses a kind of Net or Bag, in which he includes the Head, and afterwards extracts it without injuring the Parts by

When the Head is left behind after extracting the Body.

Instruments. But this seems to me more difficult, or less practicable than the preceding Methods.

The Arm
hanging out
of the Ute-
rus.

VI. Sometimes the Arm of a dead Fœtus hangs out of the Uterus in such a Manner, that it neither can, nor ought to be returned. But when it affords the certain Signs of Death, by appearing black or livid, cold and without Pulse, the Cuticle separating as we before observed, attended with a cadaverous Smell, the Midwife is then to endeavour to turn the Feet, and thereby extract it as if it were alive. But if, from the Largeness of the Arm, or the too great Stricture of the Uterus, her Hand cannot be passed, which seldom happens, it will then be necessary either to twist or cut off the Infant's Arm near the Shoulder. Before it is thus cut off, it will be more convenient to twist and extend the Arm several Times one Way: by which means the Ligaments, being partly extended and partly lacerated, may be more easily and securely cut through; but, to prevent the Point of the Knife from injuring the Mother, it will be proper to use the Scalpel armed with a Button, represented in *Tab. V. Fig. 4* and *5*. which I have sometimes used with Success. When the Infant's Arm has been thereby removed, the Hand may be then passed to turn and extract it by the Feet.

The Use of
Hooks, espe-
cially of my
own.

VII. Sometimes the Shoulders are held so fast in the Neck of the Uterus, either by its Contraction or the cross Position of the Fœtus, that the Hand can neither pass, nor alter the Position thereof without Danger of lacerating the Uterus^a, by exerting too great a Force; in which Case there is no Possibility of laying hold of the Feet by the Hand. I therefore here think it adviseable with CELSUS, to open^b the Thorax and Abdomen of the Infant, either with the Finger, Scissars, or a Hook, *Tab. XXXIII. Fig. 17* and *18*. and, after extracting the Viscera and Intestines, to try if the Feet cannot, by this Diminution, be more easily come at, and the Fœtus thereby extracted, which has generally succeeded with me when I have tried this Method. But if notwithstanding the Parts remain contracted, and the Feet concealed, or out of reach, then the Nates are to be extracted by passing the Hand under them, and the Hook into their upper Part, after which the Trunk and Head will follow of themselves, but frequently not without leaving some Parts behind^c. But to avoid injuring the

^a That the Uterus may be sometimes burst in the Delivery, I am convinced from the Experience of myself, and the Observations of others; see STALPART VANDER WIEL *Obs. &c.* and our Dissertation *de Fœtu ex Utero matris mature excidendo*.

^b There are indeed some, who boast they can always deliver the Fœtus without the Use of Instruments, and also reflect with Severity upon those, who, in difficult Cases, apply them. Such are chiefly VIARDELIUS, DEVETER, and LA MOTTE: when, at the same Time, we find Instances in the Treatises of the two last, where they were obliged to have Recourse to Instruments when both their Hands were insufficient.

^c VIARDELIUS, who endeavours to discard or reject the Use of Instruments for extracting a dead Fœtus, in Confirmation of his Doctrine, alledges a Case, wherein the Head of a dead Fœtus stuck so fast in the Vagina, as to put him to the greatest Difficulties; which, however, he at last extracted, after an Hour's Fatigue, with both his Hands. But the Consequence was that the Mother died soon after with a Mortification of the Parts; whereas, if a proper Hook had been timely and skilfully fixed in the Head, or its Brains scooped out, it might then have been extracted in a few Minutes, with Ease both to the Patient and Operator, and the Mother possibly by that means preserved from the bad Effects which must necessarily follow from the Contusion, or Violence and Injuries offered to the Parts by the Hands, which are much too bulky, considering the small Capacity and Stricture of the Parts.

Uterus,

Uterus, in introducing the Hook for this Purpose, it may be proper to have its Handle made with Notches, as in *Tab. XXXIII. Fig. 19.* that, by feeling with the Finger, we may be able to judge of the Position in which the Instrument is to be directed in the Uterus, so as to enter the Fœtus without injuring any other Part. Without which Precaution both the Bladder and Uterus have been very often dangerously wounded, which might have been avoided by this Artifice, as I have frequently myself experienced. Another Advantage in the Handle of this Instrument is, that when one of my Hands proves not strong enough to make the Extraction, the other Hand being engaged with the Fœtus *in Utero*, I fasten a strong Ligature about the Neck of it, marked *bb*, whereby the Midwife, or any other Assistant, may also draw while my own Hand guides, and partly also extracts the Handle, which is an Advantage not to be found in common cylindrical Handles:

VIII. They also act with Reason, in my Opinion, who prefer and use the large Forceps, which we have before described, in *Tab. XXVIII.* for extracting the Stone; as much better than any Hooks, or other Instruments, not only because they are less apt to injure the Uterus, but also as they may be more easily held in the Hand of the Surgeon; though at the same Time there is no less Caution necessary in the Use of these, than of other Instruments, in order to avoid pinching and lacerating the Mouth, or any other Part of the Uterus.

Use of the
Forceps.

IX. HOORN has still another shorter Method of his own for extracting the dead Fœtus when its Arm is fettered in the Vagina, which consists in dividing the Neck from the rest of the Body either with a Hook or an obtuse-pointed Scalpel, when there is not Room enough for the Hand to pass to its Feet. After this the Fœtus comes forth with little or no Trouble; the Operator drawing it only by the Hand, and the Head may then be afterwards extracted, either by the Hand alone, or the Artifices before proposed. Agreeable to which we find CÆLUS directing the same Method in the same Case, where he says, “When the Fœtus presents in a transverse Posture (much in the Manner as in *Tab. XXXIII. Fig. 8 and 10.*) the Remedy is then to cut off the Neck, that the Parts may be extracted separately.”

HOORN'S
Method of
Extraction.

X. Though I am not altogether against the Use of Instruments when really necessary, yet I would not advise them but in desperate Cases, where there are no Hopes left of a Delivery by the Hand and Medicines. Therefore every prudent Midwife ought to be well assured, that the Infant is dead before any Instruments are applied: otherwise it would be reasonably deemed a rash Action in any Operator to extract the Fœtus, by pulling it to pieces before it is dead, except there be some particular and important Reasons, as when the Mother's Life is in the utmost Danger, and will be inevitably lost through Weakness, if the Birth be delayed any longer. In this Case I must needs think it may be done with a safe Conscience^a, as well as with the Consent of the most learned Prelates of the *Lutheran* Church, notwithstanding the Doctors of the Church of *Rome* will not allow of it, as we before observed in our Chapter upon the *Cæsarean* Section. Yet the most experienced Surgeons have been sometimes

A Caution
concerning
the Use of
Instruments.

^a See *Chap. CXIII.* preceding on the *Cæsarean* Section.

mistaken, and extracted the Fœtus either alive, or not quite dead, when themselves, the Mother, and Assistants, all of them believed it had expired. It is therefore no wonder, that CELSUS reckons the Business of delivering the Infant from the Womb to be one of the most intricate, dangerous, and difficult Operations, requiring the greatest Judgment and Caution. However, when the Fœtus appears to be alive, and the Mother's Strength still continues, no Instrument should be passed to extract it. And as for the *Specula Uteri* proposed and described by ALBUCASIS, SCULTETUS, MAURICEAU, and others, I am so far from thinking them useful and necessary, that I must rather, with many of our modern Physicians and Surgeons, judge them to be pernicious, and apt to injure the Parts.

C H A P. CLIV.

Of profuse Hæmorrhages or Floodings of the Uterus in Women with Child.

Cause of the Disorder.

I. SOMETIMES Women with Child, especially those who are near their Time, have a more or less copious Discharge of Blood from the Uterus, which is different from the Menfes, because it happens in Women who are pregnant. Sometimes this Flux proceeds, especially in the first Months, from the Patients being too full of Blood, unattended with Weakness or any other bad Consequence, and more particularly if it coincides with those Times of the Moon, when the Menfes use to flow: this Redundancy is evacuated by a Rupture of the Blood-vessels of the Vagina and Uterus, and those which communicate with the Membrane of the *Chorion*, from whence a milder Hæmorrhage; or with the Placenta, whose Discharge is more copious. But very often in the last Months the Hæmorrhage proceeds from a total or partial Separation of the Placenta, (which is very dangerous) occasioned by some external Violence, as a Fall, Leap, Blow, &c. or from too great a Redundancy of Blood; to which some of the Moderns add an Adhesion of the Placenta to the Mouth of the Uterus, which separates when that Part relaxes itself at the Time of Delivery, so that the more the *Os Uteri* is dilated, the greater Separation is made of the Placenta^a: and consequently a greater Hæmorrhage follows, sometimes so profuse as greatly to weaken the Mother, if not to endanger her Life; and if the Fœtus be not timely extracted with the Hand before fainting Fits, &c. come on, both it and the Mother cannot long survive^b.

Diagnosis and Prognosis.

II. This Disorder is sufficiently apparent from the Relation of the Mother, and from inspecting the Flux of Blood this way discharged; but whether it proceeds from the Vagina only, or from the Uterus, cannot well be determined

^a See BRUNNERI *Diff. de Part. p. n. ob situm placentæ super orificium internum Uteri*, Argentorat. 1730. and STUART'S *Diff. de Secundinis*, Anno 1737.

^b There was a Woman some Years ago near her Time at *Helmstadt*, who was taken with a profuse Bleeding from her Womb, without any manifest Cause, of which she expired in an Hour's Time, notwithstanding she had the immediate Assistance of an expert Midwife. But the Husband not permitting me to open her, I could neither save the Fœtus, nor discover the Cause.

but by searching with the Finger up to the *Os Uteri*. For if, upon passing the Finger into the Vagina, the *Os Uteri* is found shut, the Flux then proceeds from the Vagina only, and the Quantity discharged is usually not immoderate. But if, on the contrary, the Hæmorrhage is profuse, the *Os Uteri* appears relaxed, and the Finger perceives the spongy Substance of the Placenta instead of the Infant's Head, it then denotes, that the Flux proceeds from the Uterus by a Separation of the Placenta, which is a Case much more dangerous than the former. This Case is generally attended with a Tension and Inflation of the Hypochondria, violent Pains in the Belly and Loins, Paleness and Languor. The larger the Hæmorrhage, the more dangerous; and, if speedy Assistance be not given to the Mother and Infant, when fainting Fits approach, the Lives of both are in the utmost Danger. But if the Mother's Hands are cold, and her Eyes look dim, her Pulse becomes weak, attended with a cold Sweat and Convulsions, which are the usual Consequences of a very profuse Bleeding, we may then reasonably conclude there are no Hopes, but Death is at hand; and that therefore it is better for the Operator to do nothing, lest he should be censured by the ignorant, as being accessory to her Death.

III. When this Disorder proceeds from too great Fulness, violent Heat, or Commotion of the Blood, it may be generally remedied by Bleeding in the Arm, exhibiting ^a cooling and astringent Medicines, with a little of *Mass. Pil. de Cynogloss.* and recommending the Patient to a proper Diet and Rest both of Body and Mind. But if the Flux is very large, proceeding from the Uterus itself, and not yielding to the means before proposed in that Case, the Separation of the Placenta usually occasions it. There is then no other Remedy left but to extract the Fœtus and Secundines with the Hand, because the ruptured Vessels of the Uterus cannot contract themselves so long as they are distended by the Fœtus, and its Appendages. Therefore Medicines proving useless, the only Remedy is a dextrous Extraction of the Fœtus with the Hand in the following Manner:

IV. In the first Place, the Mother is to be laid in a convenient Posture upon a Bed with her Hips elevated, her Legs opened, &c. as we have before directed in difficult Labours, *Chap. CLII, CLIII*. This done, if in the first Months, the Fœtus being yet small, two Fingers dipt in Oil, and gently introduced into the Uterus, are generally sufficient to extract the Fœtus either alone or with the Secundines: and this is called an Abortion. But if in the last Months, the Operator then passes his Hand, lubricated with Oil or Butter, through the Vagina to the *Os Uteri*, which if not sufficiently open of itself, he may then moderately dilate it with one, two, or more of his Fingers, till it will admit his whole Hand, which cannot easily be done, when the Placenta adheres to this Part. In this Case the Operator must gently separate it with his Fingers, where it adheres with the least Force, observing not to separate more of the Placenta than will make way for his Hand, to avoid a more profuse Hæmorrhage, and the Death of the Patient. If the Placenta obstructs the *Os*

Treatment.

Manner of
extracting
the Fœtus.

^a Such as *Pulv. antispasmod. vel temperant. c. spec. de hyacinth. & pauco opio*. Spring-water impregnated with Nitre or an Acid; or *Aq. Burf. Pastoris cum Syr. Corall.* or *Decoct. Citrat. Myrsiciti* for her common Drink. Externally, a Cataplasm of red Wine applied almost cold, or *Oxyerate*.

Uteri after it has been separated, in that Case *HOORN* extracts it first, and the *Fœtus* afterwards; for in this Case there ought not to be any Delays. And therefore the Hand is to be immediately passed into the Uterus, to extract the Infant by its Feet, in order to preserve the Mother, though perhaps the former is immature. But as the Membranes of the *Fœtus* remain sometimes entire, in order to lay hold of the Infant's Feet, they may be divided by the Finger-nails, or a Hook, as we observed in the preceding Chapter. This is done more easily, when the Feet present first. But if the Head, it is much more difficult, as it can scarce be held firm enough on Account of its Lubricity, and the Feet in this Case lying uppermost are not so easily found: however, they must be searched for with the utmost Diligence, turning the Head aside, and the *Fœtus* be extracted by them.

V. The *Fœtus* thus extracted, the *Secundines* usually follow of themselves, as being in this Case already separated from the Uterus; and, if there should remain any Adhesions, they are to be gently freed with the Hand before the Extraction. Which being performed, and the concremented Blood drawn out, to prevent it from occasioning any After-pains, the Vessels will contract themselves, and the Flux of Blood gradually diminish, especially with the Assistance of proper external and internal Medicines, and Rest. In the mean Time, the Patient being greatly weakened by so considerable a Loss of Blood, she should be treated with a restorative Diet and Medicines, as we before directed in violent Hæmorrhages; particularly warm Suppings, as Broth, Milk, Jellies, Almond-emulsion, and the common Ale-cordial. And if, by this means, the Mother survives six Hours after, she generally recovers; the Hæmorrhage ceases, and she regains new Strength from those thin Aliments. So that, in Cases of this Nature, the Extraction of the *Fœtus* should not be deferred till the Mother falls into Fainting-fits; for, by such Neglect, I have known many who have perished in the Flower of their Age. For Examples, the Reader may consult *MAURICEAU Obs.* 89. and his Index under the Title of our present Subject.

Puzos's
Opinion.

VI. The modern Writers on this Subject maintain, that in these Cases no Advantage is to be expected from the Labour-pains, (which would exclude Blood only instead of the *Fœtus*) but from the Hand alone, for the Extraction of the Infant. I myself was formerly of this Opinion. But *Puzos*, in the Memoirs of the Royal Academy at *Paris*, asserts that these Pains are so far from being noxious, that he has found them very serviceable, if the Surgeon knows how to make a proper Use of them. He has therefore proposed the following Method, by which in these Cases both the Mother and Infant may generally be preserved. He observes, that in the first and latter Part of her Time, the Patient is more subject to Flooding than in the intermediate Season; which he accounts for: but that in the last Months they are infinitely more dangerous, as they generally arise from a Separation of the Placenta from the Uterus. He first shews that they may be frequently remedied by Bleeding, by cooling Medicines, by Rest and a proper Diet. That if these prove insufficient, we must proceed immediately to exclude the *Fœtus*, for its own and the Mother's Preservation; but not by the violent Methods described above. But, as he had observed that Women labouring under Floodings, if they had very strong

strong Pains, generally escaped, and were delivered with Success; he chose prudently to imitate Nature, and, where the Pains were deficient, to stimulate and excite them. Therefore, when his Patient was seized with a Flooding in the last Months, and the Labour-pains went off, he quickened them so, that, by the Assistance of one Finger or more, he gently dilated the *Os Uteri*; by which Means it opened itself more and more gradually, and the Waters were in some measure formed. He then burst the Membranes for the Discharge of the Waters; after which the Uterus and its Vessels contracted themselves, the Hæmorrhage decreased, and the Infant's Head was protruded towards the *Os Uteri*. Then by continuing the gentle Dilatation with his Fingers, and still promoting the Pains, the Birth soon followed, and the Mother and Fœtus were both happily preserved, who had both probably perished in the natural Way, and by the too violent Method of Extraction. And this Practice our Author confirms and illustrates with various Observations. But if by this Means the Mother and Infant cannot both be saved, through the great Weakness of the Patient; yet, by following the Rules here laid down, the Fœtus may be extracted after the usual Method with much greater Ease, and less Inconvenience and Pain to the Mother.

C H A P. CLV.

The Method of extracting the Secundines.

I. **T**HE After-burden, or Secundines, was so termed by the Ancients, as coming in the second Place after the Fœtus: these are the Navel-string, Placenta, and Membranes including the Fœtus, *viz.* the Chorion and Amnios, which are generally excluded together, I say generally, because sometimes a part of the Membranes adheres to the Uterus after the Placenta has been extracted, and, by putrifying there, excites malignant Symptoms. The Secundines generally separate from the Womb spontaneously after the Infant has been delivered, or at least they are usually freed and excluded by the Assistance of the Mother's Throws. However, if they should adhere to, and remain in the Uterus after the Birth, either from their Largeness, a Laceration of the Navel-string, or a too strict Cohesion, it will then be proper to separate and extract them with the Hand, lest the *Os Uteri* should contract and retain them, and, by putrifying in the Womb, they might occasion most malignant Fevers, Pains, profuse Bleeding, and even Death itself^a. But before we attempt an Extraction of the Secundines it is highly necessary to search in the Womb, to see if there be another Fœtus, or perhaps more. For in this Case by a premature Extraction you may occasion a violent Hæmorrhage, and destroy both the Mother and the remaining Infants. Those that remain must be first extracted by the Feet, and last of all the Secundines. I am not indeed ignorant, that it is the Opinion of many, the Secundines need never be extracted with the Hand, be-

When their
Separation is
easy.

^a As hath been observed by TULPIUS *Lib. 4. Obs. 42.* MAURICEAU in *Obs.* & COHAUSEN *Lucina Ruysschiana*, where there are many Instances collected together from Writers.

cause they generally separate either of their own Accord, or putrify, and come away after a few Days or Weeks^a. But I think their Opinion the safest, who approve of timely extracting them with the Hand, when they do not immediately follow the Infant, as is advised by HIPPOCRATES, CELSUS, and the major Part of our modern Physicians; and this the rather, because we are furnished with many Instances of dreadful Symptoms which have followed a Neglect hereof, such as violent Pains, Floodings, malignant Fevers, and Death itself. It is therefore most adviseable to extract them as soon as possible immediately after the Birth of the Infant, while the *Os Uteri* remains open, and freely admits the right Hand, which is to be guided by the Navel-string held in the left till it arrives at the Placenta, which is to be gently freed from the Uterus by the Fingers, and then extracted^b. But if it adheres more strongly than usual, it will be necessary to tie the Navel-string, and cut it off near the Infant, and, winding it round the Fingers of the left Hand, to pull it moderately in various Directions, while the right Hand is freeing it from the Womb, as we have represented in *Tab. XXXIII. Fig. 9.* But if all this is not sufficient, it may be proper to rub the Patient's Abdomen with one Hand, or to direct another to do it, advising the Mother to cough and strain, in order to promote its Exclusion, which seldom resists these means. Care should be taken not to draw the Navel-string and Placenta too violently, for fear of inverting, or even extracting the Uterus, which has been done by some ignorant Midwives, to the Hazard of the Patient's Life^c. Lastly, when the Placenta has been thus extracted, it may be proper, as CELSUS advises, to pass the Hand again into the Uterus, in order to free it from the grumous Blood, or any Pieces of the Secundines, which may be left behind, and might prove the Cause of violent Pains, Floodings, &c. It may be also not amiss to continue the Hand doubled in the Uterus for some Time, that it may more equally contract itself, whereby many bad Symptoms may be prevented.

When the
Secundines
adhere firmly.

II. If the Placenta should adhere so strongly as not to give way to the several means before proposed, it will be necessary to separate it gradually with the Fingers from the Uterus: which may be generally done without any great Difficulty, when any Part of it is loosened, and the Thumb being applied in its Center, the Fingers are extended to its Sides, and gradually insinuate between it and the Uterus. But if it will not easily separate in this Manner, we are notwithstanding to endeavour at it, especially with the Thumb and two first Fingers; and, if they fail, it may be bored through in its Middle by the Fingers, and by that means separated, but with Caution, to avoid injuring the Uterus by the Finger-Nails, or any Violence, which might invert it. For, it is certain, there are many Cases in which the Placenta adheres so firmly to the Uterus,

^a This Opinion was countenanced by RUYSCH towards the latter Part of his Life, in a Treatise at *Amsterdam, de Uteri Placenta*, Ann. 1725.

^b There are some who affirm, the Ancients were ignorant of this Method of extracting the *Secundines*; but whoever peruses *Lib. VII. Cap. 29.* of CELSUS, will perceive, that he was both well acquainted therewith, and has also given us an accurate Description of the same.

^c Many advise only to draw the Navel-string till the *Placenta* follows, which is a Method very hazardous, to risque the breaking of the Cord, whereby the Extraction would be rendered much more difficult; and therefore it is more adviseable to pass the Hand thereby to the *Placenta* itself.

that it cannot be extracted without a considerable Force, as I have myself experienced; and PAREY mentions a Case in which the Placenta could not be extracted by any Art: In many of which Cases a violent Separation of the Placenta frequently proves fatal to the Mother, according to the Observation of various Writers. If therefore the Placenta will not give way but to great Violence by the Hand, it is better to desist, and make Trial of forcing Medicines, which I have frequently known to succeed, particularly the *Pulv. ex arefacto Anguillæ hepate unâ cum Bile, vel ex Mar. Borac, cum Aq. puleg. & Cinnam. Pil. Aloet, &c.* to which we may add a stimulating Clyster, and Suppository with sternutatory Powders, which are advised by HIPPOCRATES. And it is better to commit the Business to Nature, assisted by these Remedies, than violently to separate or lacerate the Placenta from the Uterus by the Hand, which may be attended with the most malignant Symptoms and Death itself, as we are assured by many Observations. The like Caution should be also used by the Surgeon, not to force his Hand violently into the Uterus, when its Mouth is contracted from his having been called too late. Yet, if the Midwife has neglected to extract the Secundines immediately after the Birth, as the *Os Uteri* in some Women continues open enough for many Hours, nay sometimes a Day or two, to admit the Hand; a skilful Surgeon or Physician being called in, may with great Prudence attempt it, especially if encouraged by the Solicitation of the Patient.

III. If the Navel-string should be broke, either through the Imprudence of the Midwife, its own Weakness, a Putrefaction, or any other Cause, it is then very difficult to lay hold of, and extract the Placenta by the Hand, for want of the String which should be its Guide; so that those who are not well versed in these Matters may mistake, and injure the Uterus, instead of the Placenta, which ought therefore to be carefully distinguished from each other. In this Case the Patient must be placed in the Chair we before recommended in difficult Births, *Chap. CLII. Sect. XIV.* that the Surgeon may better examine the Parts, and by his Touch distinguish the Placenta from the Uterus. If a small Part of the Navel-string should yet adhere to the Placenta, its Extraction may be thereby attempted, and often performed with less Difficulty: but when it is broke close off from the Placenta, the latter should be well distinguished from the Uterus by its vascular Texture and Inequality, which may be perceived by the Fingers, as represented in *Tab. XXXIII. Fig. 13.* After which the Surgeon is gently to loosen, and separate it from the Uterus with one Hand, while with the other he presses upon the Abdomen of the Patient, opposite to the Placenta, or else directs an Assistant to do the same. Lastly, we are here to observe, that DEVENTER, and some others, affirm, that the Placenta always adheres to the Fundus of the Uterus, in which Part it therefore ought always to be searched for. But DE GRAAF, VAN HOORN, SLEVOGTIUS, BRUNERUS, STUART, myself, and others, have both asserted, and experienced the contrary; for sometimes it does not adhere to the Fundus, but to the Sides of the Uterus, or to its anterior Part, from whence it should be gently separated and extracted, as before. When extracted, a strict Enquiry should be always made, whether it be entire or whole, that, if not, the Remainder

Method of
Extraction
when the
Navel-string
is broke.

mainder may be afterwards searched for, and extracted together with the grumous Blood.

RUYSCH'S
Opinion on
this Head.

IV. I cannot, in this Place, omit the Opinion of the celebrated RUYSCH, who has published a professed Dissertation upon our present Subject; in which he attributes a kind of orbicular Muscle to the *Fundus Uteri*, whose Office is to exclude the Placenta, which Muscle can generally perform its Office without the Assistance of Art. So that if the Placenta does not easily follow the Hand, by gently drawing, he thinks it adviseable to leave it to Nature and the Action of this Muscle; and the rather, because himself, being a Physician of ample Experience, and ninety Years old, had always found, that separating the Placenta by the Hands, not only occasioned the most malignant Symptoms, but also frequently the Death of the Mother: whereas Those, in whom this Business had been left to Nature, generally recovered, the Expulsion being happily effected by Nature only. He therefore lays it down as a necessary Caution, never too rashly to introduce the Hand into the Uterus, and forcibly separate the Placenta. Though I do not altogether dissent from the Opinion of this celebrated Physician; yet I must own, in Conjunction with many others, that we are furnished with not a few Instances, where the Mother has expired^a from a Retention of the After-burthen; and therefore I am firmly perswaded, that RUYSCH does not intend to forbid an Extraction of the Secundines in all Cases, but only where it cannot be performed but with Violence, which is also apparent from his *Advers. Anatom. Dec. 2.* I must therefore give it as my Advice, never to leave the Secundines in the Uterus, nor commit their Exclusion to Nature when they may be separated and extracted without Violence. But if they require an uncommon Force, or the Mother is convulsed, it is then adviseable to defer the Operation, and assist the Mother with proper Medicines, as we have before directed, whereby they are frequently excluded without the Assistance of the Hand^b.

V. For my own Part, I would never leave an Affair of this Consequence to Nature alone, who is often insufficient in these Cases. I have therefore advised, that, while the Medicines before directed are applied, the Midwife should pass gently her fore and middle Fingers through the Vagina to the *Os Uteri*; and this two or three Times a Day: and if she feel any of the Secundines, extract them cautiously; which will be more easily effected, if the Patient can stand up against a Wall with her Legs distended. By this Means, in rising, in standing upright, and (if possible) walking a little with Supporters, they will recede gradually from the Womb, and descend to the Vagina or *Os Uteri*, so as to be extracted by the Midwife. And thus many have been relieved and restored to perfect Health, who might otherwise have died immediately, or at least been worn out by a lingering and inveterate Disorder. If the Secundines should appear to be already putrified from neglecting to extract them, in that Case great Care should be taken to prevent the Uterus itself from mortifying; in order to

^a For Instances of which, the Reader may consult LEPORINUS *de Secundinis.* COHAUSEN *in Lucina Ruyschiana.*

^b As it is observed by HIPPOCRAT. *de Morb. Mulier. Lib. I.* ÆTIUS *Tetrabibli. Lib. IV. Serm. 4. C. 24.* ÆGINETA *Lib. VI. Cap. 75.* PAREY *Lib. de Generat. Cap. 18.* BARTHOLIN, SOLINGEN, MAURICEAU, RUYSCH, and many more of the Moderns.

which



which if the corrupted Parts cannot be extracted by the Hand and Fingers; they may be brought away by injecting with a Syringe some vulnerary Decoction, *ex fol. Agrimon. Scord. Absinth. cum Mel. Rosar. Elix. propriæ. &c.* This Decoction may be injected several Times every Day by the Syringe represented in *Tab. VI. Fig. 12 and 13.* till all the foreign and corrupted Parts are washed away, at the same Time not neglecting the Use of internal Medicines proper for expelling the Secundines, together with stimulating Clysters.

VI. If the Placenta should be retained in the Uterus as in a Bag, from a spasmodic Contraction of its Mouth, so as to make the Operator imagine it to be absent, of which we have some Instances given us by the Moderns, the Case is then not without Difficulty. However, in order to extract the imprisoned Secundines, the Hand is to be guided by the Navel-string to the *Os Uteri*, which is then to be gradually dilated, first by one, and then by inserting the rest of the Fingers, till the whole Hand is introduced, whereby the Placenta may be laid hold of, and extracted. If the Reader is desirous of more upon this Head, among others, he may consult MAURICEAU *Lib. 2. Cap. 9.* LA MOTTE in his *Obs.* COHAUSEN in *Lucina Ruyschiana, &c.*

When retained in some Cell of the Uterus.

An EXPLANATION of the THIRTY-THIRD PLATE

Fig. 1. Shews the Method of examining the State of the *Os Uteri* with one or two of the Fingers to discern whether it be dilated, contracted, or in an oblique or straight Direction; from whence the Operator may form a Judgment concerning the Delivery, whether it will come presently, easily, or difficultly, &c. A denotes the Uterus, BB the Vagina laid open, CC the *Os Uteri internum*, as yet contracted; but in its right Situation, D represents the Manner of examining the *Os Uteri* with one or more of the Fingers, which, if obliquely situated either forwards toward the *Os Pubis*, backwards on the *Os sacrum*, or towards either Side, denotes a difficult Delivery.

Fig. 2. Represents the natural Posture of the Infant in the Birth, with its Head protruding into the *Os Uteri*, under the Arch of the *Ossa Pubis*, A the Infant; BB the Womb laid open; CC the *Ossa Pubis*; DD the *Ossa Ischii*; EE the *Ossa Ilei*; F the Navel-string; G the Secundines adhering to the Womb.

Fig. 3. An Infant presenting with its Feet foremost.

Fig. 4. Shews the Nates offering themselves, and the Method of forwarding the Birth by applying the Hands to extract them.

Fig. 5. Represents the Fœtus in a transverse Position, with the Hand of the Operator endeavouring to turn it.

Fig. 6. Shews the manner of apprehending the Infant's Feet, turning and extracting them.

Fig. 7. Shews the Infant in a transverse Position, with its Abdomen towards the *Os Uteri* and Vagina; in which Posture the Navel-string often comes out, to the Hazard of the Infant's Life.

Fig. 8. Represents the Head obstructed by the left Side of the *Pelvis*, and the Neck strongly compressed by the Contraction of the Uterus; which renders the Birth extremely difficult, or impracticable.

- Fig. 9.* Shews the Infant's Head inclined towards the right Side of the *Pelvis*, with the Manner of replacing it by the Hand, when the Waters have been lately discharged.
- Fig. 10.* Shews the Infant presenting its Elbow or Shoulder to the *Os Uteri*, with the Manner of apprehending the Feet, in order to turn and extract them in this, and other unnatural Postures.
- Fig. 11.* Denotes the Manner of passing up the Hand, in order to turn and extract the Infant by its Feet, when its Hand and Arm hang out of the Womb.
- Fig. 12.* Shews the Infant with one Foot out, and the Manner of investigating the other for its Extraction.
- Fig. 13.* Exhibits the Method of separating and extracting the Placenta from the Womb, when it does not easily follow the Infant. There the Navel-string *A A* is held by the left Hand *B*, while the right Hand *D* is thereby guided in the collapsed Uterus *C C*, to the Placenta *E*, which is hereby separated from the Uterus.
- Fig. 14.* Represents a Chair frequently used among us for delivering Women: *AA* its Back; *BB* the Sides; *C* the Seat, having a semicircular Piece cut out in the middle, that the *Os Coccyx* may bend back, and the Fœtus have room to pass out; *DD* the two Handles which are grasped by the Patient in each Hand.
- Fig. 15.* Is another Chair for the same Use, with a flexible Back, that if the Birth should be preternatural it may be let down, and the Patient inclined on it as if upon a Bed, to facilitate the Delivery; but, in Defect of this Chair, a common Bed or Table may suffice.
- Fig. 16.* Gives an Idea of the broad Steel-hooks of *PALFYN*, for extracting a Live-Infant without Injury, when its Head sticks in the Vagina; but their true Size is as large again as the Figure. It is necessary to have two of them, that one may be applied to each Side of the Head.
- Fig. 17 and 18.* Represent a lateral View of the Hooks, which I generally use when there is Occasion for extracting a Fœtus. *A* their Points, *BB* their Backs.
- Fig. 19.* The Handle of these Hooks with Notches *aaaaa*, in that Part which corresponds to the Back of the Instrument, that, by feeling with my Thumb, I can tell how the Hook is directed out of Sight in the Womb, so as to avoid injuring it. And in the Groove *bb* a Ligature may be fastened, by which the Extraction may be also forwarded by some Assistant.
- Fig. 20.* Represents a View of the anterior Part of the Point of the Hook separate.
- Fig. 21.* Exhibits a double pronged Hook for the same Purpose.

C H A P. CLVI

The Method of discharging Molæ, or false Conceptions.

I. **A** Mola is a fleshy Excrescence, or Mass, without a regular Form produced in a Uterus, either from a Concretion of the menstruous Blood, a Retention of some Part of the Secundines, or from an Ovum not properly fecundated. This Disorder seldom happens to Virgins or Widows, but frequently to married Women, as we are assured by Experience; though they are sometimes observed in the two first, and I myself once saw one of them in a chaste Widow^a. If we regard the Size and Figure of this Substance, we shall find therein a surprising Difference. Some of them are found not at all adhering to the Uterus; others are attached to it by one or two Blood-vessels, or fleshy Fibres; and others again are very strongly and intimately conjoined^b. They are generally found alone in the Uterus, but sometimes they are excluded together with the Fœtus. If they are excluded without the Fœtus, it is usually about the End of the second or third Month, the same Pains generally preceding which attend a real Delivery; though the Pains are sometimes more violent, and the other Symptoms more severe, the Hæmorrhage is also frequently so large, as to put the Life of the Mother in the utmost Danger. Sometimes a Mola is retained for many Months in the Uterus, and acquires a Bulk sufficient to distend the Abdomen like a mature Infant.

A Mola described.

II. It is, for the first four Months, a difficult Matter to distinguish, whether the Womb is impregnated with this false or a true Conception, since both of them are generally attended with the same Symptoms in that Time: but afterwards they afford Signs different enough to distinguish the one from the other. For, 1. when there is a Mola, the Mother does not perceive those Commotions in the Uterus, as she constantly does from the Infant about the fourth or fifth Month after Conception. 2. A Mola distends the Abdomen equally on all Sides; whereas an Infant makes it most prominent towards the Navel, or one Side. 3. A Mola slips from one Part to another, when the Mother puts herself into different Postures, which is a Circumstance not to be observed, when there is a real and living Fœtus. 4. The Breasts of those who have a Mola, are generally but little or nothing distended with Milk; whereas they are gradually and considerably distended therewith, when there is a real Infant. 5. The Mother is afflicted with more grievous Symptoms during her Pregnancy with a Mola, than with a Fœtus: her Face is of a livid Hue, her whole Habit and Appetite are greatly vitiated and impaired, and she is frequently molested with excruciating Pain about the Region of her Loins and Pubis; from all which

Signs of a Mola.

^a The like has been also observed by MAURICEAU towards the latter End of his Book, *Obs.* 33. and by KERKRINGIUS in *Spicileg. Anatom. Obs.* 81. which are discharged with violent Pains.

^b Instances of this Disorder may be seen described by HILDANUS, *Cent. II. Obs.* 52. GUILLEMEAU *Lib. de Gravidit. Cap. IV.* SIGISMUNDA *apud CONNOR in Diss. Med. Physic. de humani Uteri Sarcomata*, pag. 57. SAVIARD *Obs.* 36.

one may conjecture, that there is not a Fœtus, but a Mola in her Uterus. But it is to be observed, that sometimes a Dropsy in these Parts may occasion all the preceding Symptoms of a Mola. 6. A particular Change in the internal *Os Uteri*, which a skilful Surgeon will perceive by the Touch, clearly distinguishes a true Conception from a false one. And, lastly, in a false Conception the Patient generally complains of a darting Pain about the Region of the Uterus.

Method of
discharging
a Mola.

III. When you are convinced, that there is not an Infant, but a Mola, in the Womb, the next Business is then to attempt its Expulsion by proper Medicines: and if they miscarry, an expert Midwife or Surgeon should endeavour to deliver this foreign Body from the Uterus by a judicious Application of the Hand. If the Mouth of the Uterus should be too strongly contracted to admit the Hand of the Operator for this Purpose, it will then be necessary to excite the Mother's Throws by the Administration of brisk Cathartics and strong Clysters; while the *Os Uteri*, and Parts adjacent, are in the mean Time gradually relaxed and opened by the Application of emollient Fomentations, &c. Which done, one or two of the Fingers are to be first gently insinuated, and then the whole Hand by Degrees, in order to extract the Mola, as we have before directed for the Fœtus, *Chap. CLIV.* If the Mola adheres firmly to the Uterus, which it frequently does, it is then to be gently separated by the Fingers before its Extraction, as we are told by HILDANUS^a, who performed this Operation. But if the Fingers are not able to make this Separation, it will then be necessary to apply a Pair of long and obtuse-pointed Cutting-forceps, like that which we have represented in *Tab. XXXIV. Fig. 1.* and which, we are told, were successfully used by SIGISMUNDA, a Midwife of *Brandenburg*, in the like Case. Lastly, if the Mola is too large to be in this Manner extirpated entire, it may be carefully separated and extracted in Pieces, either with the Fingers, a falci-form Knife, or Hook, represented in *Tab. XXXIII. Fig. 11, 12.* or the double one, *Fig. 21.* Those who are desirous of more upon this Head, particularly with regard to the Nature and Extraction of Molæ, may consult the Observations of HILDANUS, ROONHUYS and MAURICEAU. To conclude, when a Mola does not occasion any bad Symptoms or Uneasiness in the Mother, and its Extraction appears difficult, in that Case no Violence ought to be used, since we have many Instances of their being retained without any great Detriment to the Patient as long as they live; as we read in HILDANUS, *Epist. XXXVIII. XXXIX.*

C H A P. CLVII.

Of a Prolapsus Uteri, or bearing down of the Womb.

Kinds and
Degrees of
this Disorder.

I. **A**N entire falling down, or *Prolapsus* of the Womb, is, by many Physicians^b, esteemed and asserted to be a thing impossible in Nature: where-

^a *Cent. II. Obs. 52. and Epist. 38 and 39.*

^b Of this Opinion are MEEKREN, *Obs. Cap. 54.* ROONHUYS *Obs. Lib. II. Cap. de Vagina Prolaps.* VAN HOORN *Microtechn. Sect. II. Part 1. § 28.* BARBET. in *Chirurg.* VANDER BEEKE

as it is apparent, from the Observations of many eminent Physicians, both ancient and modern, that the Uterus does sometimes fall down, and hang^a out of the Vagina. Among which we may reckon those as the chief, which are inserted in the chirurgical Observations of the celebrated RUYSCH, *Obs.* 1, 7, 9, and 10, which are illustrated with elegant Figures, from whence we have taken the two represented, *Tab.* XXXIV. *Fig.* 2 and 3. After RUYSCH we may reckon the celebrated Surgeon of Paris, SAVIARD, who gives us about ten Instances of this Accident^b coming under his own Observation. To him we may add HOFFMAN, SHACHERUS, SLEVOGTIUS, and VATERUS, who have each of them described, and been Eye-witnesses of the *Prolapsus Uteri*. And lastly, the Physician BURGRAVIUS^c of *Frankfort*, with several others, have lately observed the same Disorder: to which I may add, that I myself have several Times seen a true Prolapsion of the Uterus. When the Uterus only descends into the Vagina, it is then termed a Descent, or bearing down of the Womb; but when it proceeds further, and appears out of the Vagina, it is then properly denominated a *Prolapsus Uteri*. This may be of two Kinds; either without Inversion, when the *Os Tincæ* only appears externally, *Tab.* XXXIV. *lit.* C. *Fig.* 2. or, with Inversion, when the *Fundus* presents itself to View without the *Os Uteri internum*; see *Fig.* 3. both which Cases have been observed by the forementioned Authors^d.

II. The *Prolapsus Uteri without* Inversion is generally distinguished from that *with*, by its *Os internum*, which does not appear in the last, as it does in the first, as we have represented in *Tab.* XXXIV. *Fig.* 2. *lit.* C, whereby it may be also distinguished from a Prolapsus of the Vagina, or an Excrecence of that Part. It may be worth our Observation, in this Place, to take Notice of a particular Case, elegantly described and represented by WIDEMANNUS, present Director of the *Academia Curios. Germ.* in which the whole internal wrinkled Coat of the Vagina was prolapsed in such a Manner, that every body imagined it a *Procidentia Uteri*, before they were convinced of the contrary by opening the Body, by which they found the Uterus itself in the natural Site. The Figure of this Case we have represented in *Tab.* XXXIV. *Fig.* 4. that our Reader might the better distinguish a Prolapsus of the Vagina from that of the Uterus. So that the Appearance of an *Os Uteri* at *lit.* F. is not an infallible Sign of a Prolapsus thereof, as it hath been generally taught: but the prolapsed Parts ought to be more carefully examined, in order to discover whether it be a Descent of the Vagina, or *Os Uteri*. The forementioned Author

Diagnosis

^a Lib. *de Procidentia Uteri*. KERKRINGIUS in *Spicileg. Anat.* *Obs.* 20. VERDUC in *Pathol. Chirurg.* and the many Authors cited by these.

^b AS ÆTIUS, ÆGINETA, ROSSET, AQUAPENDENS, CARPUS, PLATERUS, PAREY, PLEMPIUS, LANGIUS, FERNELIUS, HILDANUS, MARCHETTI, VESLINGIUS, BARTHOLIN, VANDER, WIEL, PECHLIN, SOLINGEN, MAURICEAU, &c.

^c In *Obs.* 10, 11, 12, 13, 15.

^d In *Ephem. Nat. Cur.* Cent. IV. pag. 261.

^e See *Commerc. Litterar. Norimb. An.* 1733. pag. 362. ——— WESSENFIELD de *Inversione Uteri* sub præsidio BERGENII, *Frankfurt.* 1732. Nor ought we to omit the warm Disputes between the two *Hamburg* Physicians, VANDER BEEKE and GARMEER, the first denying, and the last asserting and defending the Reality of this Disorder. But when the Opinion of our University at *Helmstadt* was demanded on the Subject; their Assent was given in Favour of GARMEER, who has also himself defended the Thesis with learned Arguments and solid Experience.

does not indeed give us any distinguishing Mark, whereby to know such a Prolapsion of the Vagina from that of the Uterus; though he observes, that his Probe passed further through this apparent Os of the Vagina, *lit. F.* than the Cavity of the Womb would admit of, *viz.* near six Inches. But whether this Sign always presents itself, can be only confirmed or disproved by more Observations of the like Kind.

A Prolapsus
Uteri and
Vaginæ dif-
ficult to di-
stinguish.

III. A Prolapsus of the Uterus and Vagina are not only difficult to discern, but also to distinguish from each other; as may appear from the gross Mistake made, not only by the Surgeons of *Thoulouse*, but also of *Paris*, who publicly declared a Maid of thirty Years old, to be an Hermaphrodite, and to have the male Sex most predominant, who had only a *Prolapsus Uteri* from her Youth: and therefore the Senate of *Thoulouse* commanded, at her Peril, that she should, for the future, wear Men's Cloaths instead of Women's. But, some Time afterward, this reputed Hermaphrodite, dressed like a Man, and armed with a Sword, being more accurately examined by SAVIARD at *Paris*, she appeared to be really a Woman, into which he transmuted her by replacing the Uterus; whereupon she was ordered by the King to reassume her female Dress. The Surgeons of *Thoulouse* seemed to have formed their Judgment with too much Precipitation and want of Attention, since in the whole diverting History, related at large by SAVIARD in *Obs.* 15. we do not meet with so much as the Appearance of either Penis or Testicles; without which I can see no Reason why they should pronounce any Person a Man, especially as she had very large Breasts, and a Woman's Face without a Beard.

Causes.

IV. The apparent and most general Cause of a *Prolapsus Uteri*, is from a too great Relaxation and Weakness of its Ligaments, and of the Vagina, upon which Account this Disorder is most frequently observed to follow a difficult Labour, or other violent Straining, though it may sometimes happen even to Maids and young Girls^a. Let us now consider the other Species of this Disorder, in which the prolapsed Uterus is inverted like a Bag; so that its internal Surface appears outermost, its internal Orifice lying at the same Time concealed in the Vagina, as in *Fig. 3. B.* of which, among others, we have a remarkable Instance described and cured by GENSELIUS^b. As the Uterus prolapsed in this Manner, resembles a Mola, or fleshy Excrecence, we find it has occasioned some imprudent Surgeons and Midwives to mistake the Case, and, by an improper Treatment with violent Pulling, &c. to endanger the Life of the Patient^c. Nor is this Disorder hardly ever observed, but when the Uterus is forced down together with the Secundines, or after very difficult Labour, whereby the Os *Uteri internum* is so much dilated, as easily to transmit the Body of the Womb through itself^d; especially when the Throws continue violent some Time after

^a Instances of which we have in DE GRAAF *de Org. Mulier.* MAURICEAU *Obs.* 96. SAVIARD *Obs.* 13. 15. *Misc. Nat. Cur.* Dec. I. An. 6. *Obs.* 73.

^b In *Ephem. Nat. Cur.* Cent. II. *Obs.* 193. with other Writers there cited.

^c See HILDANUS, BARTHOLIN, Cent. 2. *Hist.* 91. VANDER WIEL Cent. I. *Obs.* 67. MARCHETTI *Obs.* 61. MURALTUS *Misc. N. C.* Dec. 2. An. 1. *Obs.* 112. SAVIARD *Obs.* 15. *Commerc. Litter. Norimb.* Ann. 1733. pag. 302.

^d See RUYSCH in *Obs.* Citat. & in *Advers. Anat.* Dec. II. *Obs.* 10. MAURICEAU Lib. III. Cap. 6. & in *Observat.* 355, 685. STALPART, VANDER WIEL *Obs. Rar.* Cent. I. *Obs.* 67.

the Birth, so that by straining, this Part is forced through the Vagina and *Labiâ pudendi*. But whatever be the Cause of the Disorder, if the Uterus is not speedily reduced to its natural Situation, the Case soon becomes past Cure, and kills the Patient, as is justly observed by the forementioned Authors; and therefore no Time should be lost before the Patient is relieved.

V. In order to reduce the prolapsed Uterus to its natural Situation, after the Patient has discharged her Urine, the Surgeon or Midwife is to place her in a proper Posture, lying on her Back upon a Bed, with her Hips elevated; and, after a careful Separation of the Placenta, if that adheres to the Uterus, the latter is to be prudently and speedily replaced with the Fingers. Which may be most commodiously performed by returning the pendulous Part, *Fig. 3. C*, with the three middle Fingers, passing them first through the Vagina, and then with the whole Hand into the Cavity of the Abdomen, which may be done the more easily, as the Accident happens sooner after the Delivery, while the *Os Uteri* and Vagina are relaxed and dilated. When the Parts have recovered their former Situation, the Patient should be put to Bed, and ordered to lie still on her Back, with her Thighs close to each other: for Rest in this Posture is very often of itself sufficient. Yet it may not be amiss to secure the Womb from falling down again, either in coughing, sneezing, or otherwise, by retaining the Lips of the *Pudenda* together by Compresses and a proper Bandage. If this Disorder has continued any considerable Time, it will not be long before it proves fatal to the Mother, according to the Observation of HILDANUS, STALPART, RUYSCH, SAVIARD, and others: for the Stricture made upon the *Os Uteri*, by the Inversion of its upper Part, becomes at length so much increased by the Inflammation, as to prevent its being replaced, and turning to a Mortification, destroys the Patient. If the Surgeon is called in time to a Woman in this Disorder, his first Business is to remove the Inflammation, and to endeavour to return the Uterus. Before which should be premised a Discharge of the Urine, and bleeding in Proportion to the Circumstances of the Case; so that by preventing any Resistance to the Womb from the Bladder, and by relaxing the Parts with Fomentations of warm Milk and Water, with other emollient and lubricating Medicines, the Hand of the Operator may, by these Means, replace the Parts without much Difficulty^a. Otherwise, it will be impossible for the Patient to survive, even though the Uterus were to be secured with a Ligature, and extirpated. For RUYSCH gives us an Example of this Disorder, in which the Surgeon attempted to relieve the Patient, by making a Ligature, and cutting off the prolapsed Body of the Womb: but his Design miscarried, and the Patient died soon after.

VI. This Disorder is not near so dangerous when the Womb appears externally from a Relaxation of its Ligaments, but without Inversion, and not in the Time of Labour; to distinguish which, we have given Directions before, N^o. II. For, in this Case, the Cause being from Relaxation, not Violence, it is not so likely to be attended with Inflammation, or Mortification. It is to be observ-

Treatment
of a slight
Prolapsus
without In-
version.

^a It has been a Matter of Consideration with myself, whether Scarification of the tumified and inflamed Uterus might not be used to Advantage in many of these desperate Cases; at least I think there is Reason enough to make a Trial.

ed, that this Disorder frequently happens, not only to Women in hard Labour, but also sometimes to Maids, though even so chaste; as may be seen in the Observations of MAURICEAU, SAVIARD, and others. The Consequences of this Disorder, when neglected, are frequently very grievous; such as violent Suppression of the Urine, excruciating Pains in the Loins, with an Inflammation, Exulceration, Mortification, a Scirrhus or Cancer, which become the more obstinate and malignant as the Case is longer delayed. When this Disorder proceeds from a Relaxation of the Parts in a weak Habit, and has been some Time neglected, it is often impracticable to sustain the Womb in its proper Situation: but it will relapse again either in walking, sneezing, coughing, or moving the Body; especially if it be not assisted by a proper Bandage, and a retaining Instrument internally^a. But if the prolapsed Uterus is once affected with a Cancer or incipient Mortification, the Reduction of it will then be to no Purpose, as RUYSCHE takes Notice in *Obs.* 9.

Method of
Cure.

VII. If the Surgeon perceives, that the prolapsed Uterus is not yet infested either with a Cancer or Mortification, his Intentions of Cure are chiefly two: 1. To restore the Parts to their natural Situation; and then, 2. to prevent a future Relapse of them. With regard to the first, that may be generally performed without much Difficulty, either with the Fingers, as we before directed, N^o. V. or by a large Wax-candle: though many Women thus disordered find no Difficulty in reducing their prolapsed Uterus themselves without other Assistance. But, in difficult Cases, it is often found necessary, not only to relax and lubricate the Parts, but also to empty the Bladder and Intestines, in order for a Reduction by the Hand. But to prevent a Relapse is often difficult without the Assistance of Bandage, and a proper Machine. When the Parts therefore of the Uterus and Vagina appear to be greatly relaxed, and their Ligaments weakened, it may be proper, during the Time of the Patient's lying still in Bed, to inject aromatic and restraining Fumes and Fomentations by the Instrument, *Tab.* XXXIV. *Fig.* 14. after which may be applied the T. Bandage, with a large Compress to the *Labia pudendi*. When the Uterus is swelled and inflamed, so as to prevent its Reduction, it should be first treated with discutient Fomentations, and the Person disposed to rest for some Time in a warm Bed, before the Operation be attempted. When the Womb appears to be ulcerated, even that should not delay its Reduction: for an Ulceration of this Part may be better cured in its natural Situation than in a prolapsed Posture, as SAVIARD directs in his *Obs.* He likewise met with a Prolapsion of the Uterus in a Maid, who had also the Stone in her Bladder; and, after replacing the Uterus he then extracted the Stone, and removed both Disorders. See *Observation* 15. But she was obliged to wear a Pessary.

Instruments
to sustain
the Parts.

VIII. If the Disorder is become inveterate, and the Parts will not of themselves continue in their natural Position, it will then be necessary to pass an Instrument or Pessary up the Vagina for that Purpose. The most convenient Pessaries for this Use, are those made of Box, hard Ash, or Cork, perforated in the Middle, and covered over with Wax, represented in *Tab.* XXXIV. *Fig.* 6, 7, 8, 9. They may be made of Ivory, Silver, or Gold, for the more

^a See the Observations of RUYSCHE and SAVIARD on this Head.

opulent. One of these Pessaries of a proportionable Size is to be passed by the Fingers up the Vagina to the *Os Uteri*, to prevent its subsiding; and that the Instrument may be drawn out, and cleansed occasionally by the Patient, a String may be fastened to it, as represented in *Tab. XXXIV. Fig. 6, 10.* The Pessary may be deemed of a proper Size, when it is not too easily passed up the Vagina, but, fixing itself in the Vagina against the Uterus, sustains the latter, and ought frequently to be twice the Diameter of the former. It is necessary that the Instrument be perforated in the Middle, for the Extramission of the Menfes, and other Sordes of the Part: and therefore those Pessaries, which are of a pyriform, or oval Figure, as in *Fig. 10.* are not so convenient and useful, though they are proposed and described for this Purpose of an enormous Size by PAREY, HILDANUS, SCULTETUS, ROONHUYNS, and others^a. To which we may add, that those perforated Pessaries will both admit strengthening and astringent Fumigations and Injections to the affected Parts, and at the same Time also allow a Passage to the Semen of the Husband; which Advantages, the other Pessaries that are not perforated, are deprived of. It is to be observed, that some Women are troubled with this Disorder, when they are not with Child; and when they are, it disappears: for the Dilatation of the Womb in Gestation prevents its Descent. See PECHLIN. *Obs.* 20. and SAVIARD *Obs.* 12. But this is not always the Case; for sometimes the *Os Uteri* has appeared externally with the Head of the Fœtus capable of being felt by the Finger. Consult MAURICEAU *Obs.* 6, 67, 95. SAVIARD *Obs.* 15. and WIDEMAN *Ephem. N. Cur. Cent.* 8. *Obs.* 98.

IX. SAVIARD, in several of his Observations^b, mentions an elastic Pessary made of Steel, which surpasses all others in this Disorder; but takes no notice either of its Size or Structure. However, GOELICHIUS of *Francfort* formerly published a Dissertation 1710, in which he describes a new Method of curing the true *Prolapsus Uteri* by an elastic Pessary made of Steel-wire, of which he gives us the Figure; but not in its proper Length or Thickness; which I have therefore taken Care to amend in my Figure of it, *Tab. XXXIV. Fig. 11.* He orders its internal Surface to be covered with Linen, and its external with soft thin Leather, that it may not give any Pain or Uneasiness to the Patient: and to the Basis of the Cone he directs a String to be fastened on each Side, to extract it at pleasure. The Instrument is to be a little compressed when it is introduced into the Part; after which it will expand itself by its Elasticity, so as to remain fixed, and prevent a Descent of the superincumbent Uterus. Its Author indeed confesses, that he has not yet made Trial thereof: but as it is furnished with all the Requisites of a good Pessary for this Purpose, he thinks it cannot fail of Success. But as this Instrument is very subject to be eat up with Rust, to which Iron or Steel-wire is so extremely liable, upon contract with any Humidity, it has been my general Practice to use only the wooden Pessaries covered with Wax, as represented in *Fig. 6, 7, 8*; by which means I have generally obtained the Effect desired.

Elastic Steel
Pessaries.

^a Confer MAURICEAU *Obs.* 182. SAVIARD *Obs.* 13. DEVENTER *Cap.* 29. &c.

^b See his *Observat.* XIII. and XV.

C H A P. CLVIII.

Concerning the Prolapsus, or bearing down of the Vagina.

Nature and
kinds of the
Disorder.

I. **I**T is not unfrequent for Surgeons and expert Physicians, as well as ignorant Midwives, to confound or mistake a Prolapsus of the Vagina and Uterus with each other, and to call them by one Name, of which we have many Instances^a. But they are easily distinguishable to one, who, attending to the Symptoms of each Disorder, is also acquainted with the anatomical Structure of the Parts. We take a Prolapsus of the Vagina to be, when that Body appears either wholly or in Part without the *Labia pudendi*, whether it be from Relaxation, or any other Cause, in the Manner represented at *Fig. 4. Tab. XXXIV.* A total Prolapsion of the Vagina shews itself without the relaxed *Labia* like a fleshy Ring, red or bloody, and swelled more or less according to particular Circumstances. If the prolapsed Part should be violently inflamed and swelled, proceeding from difficult Labour, there is then great Danger of an incipient Mortification^b following, as I have frequently observed: but when there are none of those Symptoms, the Case is without Danger, and may be sustained without any great Uneasiness by the Patient. In a partial Prolapsus of the Vagina, when only a small Portion of it appears, it may be frequently mistaken for an Excrescence, Ficus, or Sarcoma; and consequently the Surgeon may treat it, to the great Danger of the Patient, either by Ligatures, or the Knife, as we have observed in Chap. CL^c. In order to distinguish a Prolapsus Uteri from that of the Vagina, and both from an Excrescence; it is to be observed, that the first never happens with an Inversion but immediately after Labour; whereas the Vagina may subside and appear externally at any Time, either within or without the Time of Gestation. But, as I have before observed, the Accident more frequently attends a difficult Labour; as it happened to a Patient of mine so suddenly, while the Fœtus was *in Utero*, that the prolapsed Vagina was, in the space of twenty-four Hours, swelled to the size of one's two Fists, appearing without the *Labia*, and beginning to be mortified, of which the Woman died in eight Days Time, notwithstanding she was delivered. From what has been said I think it apparent, that those Physicians speak inconsiderately, who assert, that the prolapsed Uterus may be extirpated, not only without hazarding the Patient's Life^d, but also that they may conceive and bear Children, notwithstanding they are deprived of this Organ. Indeed no body denies that a Woman may conceive and bear Children after a Removal of an Excrescence from the Uterus,

^a HILDANUS (Cent. IV. Obs. 60, 61, and 62.) gives us three Histories of this Disorder; but it does not appear from either of them, whether the Prolapsion was of the Uterus or Vagina.

^b As we have Instances in SOLINGEN Obs. 26. & NOLET Obs. Curieus. Obs. 5.

^c Instances of this Disorder are given us by TULPIUS, Lib. III. Cap. 33, 34. ROONHUY's Obs. Chirurg. Part II. pag. 68. KERKRING. Obs. 53. BONET Med. Septent. Vol. II. Obs. 33. But the most curious and remarkable Instance of this Case is given us by MEEKREN in the 54th Chapter of his Observations:

^d A Case of this Nature we have in CARPUS, and in Lib. XXIII. Cap. 41. of AMBR. PAREY.

or a part of the Vagina hanging out, in Form of the Womb, as in *Tab. XXXIV. Fig. 4 and 5.* But, for the same thing to succeed when the Uterus itself has been extirpated, is altogether fabulous and impossible^a.

II. With regard to the Treatment of this Disorder, when it is without Inflammation, the prolapsed Parts should be returned without the least Delay, to prevent an Inflammation, Scirrhus, or Gangrene. If the Parts are therefore without Inflammation, they may be fomented with some astringent and discutient Liquor before they are replaced; or they may be returned immediately without such Treatment either by the Fingers or a large Wax Candle, after which the Patient should keep her Bed for several Days, retaining her Thighs close together without moving her Body. However, I must needs think it the best Method to foment the Parts before their Reduction with a Decoction of discutient aromatic and astringent Herbs in red Wine, or in *Aqu. Calc. cum Sp. V.* For the same Purpose may be also used the Fumes of Mastic, Frankincense, Myrrh, Amber, &c. conveyed to the Parts by a Funnel; see *Tab. XXXIV. Fig. 4.* concluding with the T Bandage. By which means the prolapsed Parts frequently recover their pristine Strength and Tension. In some Cases it will be very serviceable to treat the Patient with mineral Waters of the chalybeate kind, and Preparations of Steel. But if the Disorder is so inveterate as not to yield to any of the means proposed, the Surgeon is then to use his Endeavours for palliating the Disorder, and mitigating its Symptoms, by ordering the Patient constantly to wear the T Bandage.

Treatment
when with-
out Inflammation.

III. If the prolapsed Parts are inflamed, they should be not only treated with discutient Fomentations and Cataplasms applied externally, but also Internals and Bleeding should not be neglected; that, after reducing the Inflammation, the prolapsed Parts may be returned, which they cannot with Safety before, without Danger of a Mortification following. But if the Inflammation is not considerable, the Parts may then be frequently returned without any Danger: though if any Sphacelus or Excrecence appear, which may be known from its Blackness and fetid Smell, discutient Fomentations and Cataplasms should be then applied, and the Parts treated as we have before directed for a Sphacelus, Part I. Book III. Chap. XIV.

Treatment
when joined
with In-
flammation
or Sphacelus.

C H A P. CLIX.

Of an Incontinency of the Urine in Women.

I. **A**N Incontinency of Urine in Women frequently proceeds from some Violence in difficult Labour, or from a too great Dilatation of the Sphincter and Neck of the Bladder, made by extracting a large Stone. But sometimes it happens without any external Violence from a natural Weakness, or a Palsy of the Sphincter-muscle; which is also sometimes observed in Males, as we have

Nature of
the Disorder.

^a Notwithstanding we have several Authorities collected by MEEKREN in *Obs.* 54.

before

before taken notice in Chap. CXXXVI. But whatever be the Cause of the Disorder, when it is of long standing, (or if it proceeds from a Palsy) it is too often found inflexible, both to all the internal Medicines and external Means that have been hitherto contrived.

Treatment
thereof.

II. When this Disorder follows from an Extraction of the Stone, the Patient being young, it frequently disappears of itself, or at least by using the external or internal Remedies mentioned in N^o. II. of the preceeding Chapter. But if the Disorder be of long standing, and does not yield to those Means, it is by Physicians generally esteemed incurable. However, HILSCHERUS, in a Dissertation upon the Subject, affirms, the most likely Method of curing this Disorder to be with a Pessary, or Ring of a proper Size, as for the *Prolapsus Uteri*, Tab. XXXIV. Fig. 6, 7, 8. for by introducing a Pessary, or Ring of this Kind, into the Vagina under the Urethra, the latter is so firmly compressed thereby, as to render the Urine capable of being retained or discharged at Pleasure. See Tab. XXIX. Fig. 2, B. C.

CHAP. CLX.

Of the Perinæum lacerated in Women.

EVERY one that knows any thing of Midwifery and Surgery cannot be ignorant, that the Perinæum, or that Part between the Vagina and Anus, is frequently lacerated in Women when they have a difficult Delivery, either from the Fœtus being very large, monstrous, or extracted double with its Nates foremost. To prevent a Disorder of this kind from incurring worse Consequences by Neglect, in the first Place, the Wound is to be washed and cleansed with warm Wine or Brine: after which it may be dressed with some vulnerary Balsam, or rather sprinkled with a Powder of Gum Mastick and Sarcocol. And if the Wound be not large, its Lips may be conjoined with sticking Plasters: but if it be large, it may be better to join them by the knotted Suture with a crooked Needle and Wax-thread, as in other deep Wounds. But particular Care should be taken, that the Patient lie still in Bed, with her Thighs close to each other, and to cleanse and dress the Wound twice or thrice a Day till it is healed: which is often impracticable, when the Disorder has been neglected at the Beginning, as SOLINGEN remarks, *Obs.* 82.

C H A P. CLXI.

Of Disorders and Operations proper to the Anus, and of Clysters.

I. **A** Clyster is a liquid Remedy, to be injected chiefly at the Anus into the large Intestines; with whose Administration almost every Nurse is acquainted. The Word is derived from the Greek *αλύζω*, *abluo*, and is synonymous with *ἔνιμα*, *Injunctio*. These kinds of Remedies were by the *Latins* called *Lotiones*, as we read in *CELSUS*; from whence the *French* Term *Lavement* seems to be derived. In *Germany*, *Holland*, and most other Parts, this Remedy is usually administered by the Bladder of a Hog, Sheep, or Ox, perforated at each End, as in *Tab. XXXIV. Fig. 12.* AA. being large enough to hold about a Pint. One of the Apertures in the Bladder is to be fastened with small Packthread, CC. tied round the End of a Pipe made of Ivory or Bone, marked BB. By the other Aperture the Clyster is to be poured into the Bladder; after which this Aperture marked D, is tied with a Ligature, to prevent its Escape. Which done, the Pipe, lubricated with Oil or Butter, is thrust into the Patient's Anus, lying on either Side with their Hips elevated; then untying the Ligature near the Pipe C, the Bladder is pressed by the Hands, and the Liquor by that means forced into the Intestines. The Operation being finished, the Instrument is extracted, and the Patient ordered to lie still in his Bed, till he has a strong Motion to stool: for, says *CELSUS*, *Non primæ Cupiditati dejectionis æger protinus cedere debet; sed ubi necesse est, tum demum desidere.*

Injection by
a Pipe and
Bladder.

II. The *French*, and sometimes the *Dutch*, and other Nations, use a Pewter Syringe instead of the preceding Apparatus, the Capacity of the Instrument being large enough to hold a Pint. The Pipe of the Syringe nearly resembles the former; but the Liquor may be thereby not only drawn in with more Ease and Expedition, but also more forcibly expelled and drove further into the large Intestines. Yet the preceding Apparatus is more concealable and portable, and also less uneasy to Infants and Women with Child. But for over-modest or bashful Patients, the *Parasians* fasten a Leather-pipe of about half an Ell long to the Syringe, whereby the Patient can administer the Clyster to himself; or, after inserting the Pipe into his own Anus, another Person may force the Liquor out of the Syringe through the Pipe which lies under the Bed-cloaths. Upon this Head the Reader may consult *HILDANUS Cent. I. Obs. 7, 8.* *BARTHOLIN. Hist. Anat. bb. Cent. 6.* *DE GRAFF*, in a professed Dissertation upon the Subject, with *JUNKENIUS* in his *Surgery*, and *VALENTINUS* in his *Politica Exotica*, pag. 89. where the Machinery for this Purpose, and the Method of using the same, is described at large. For the rest, I shall only observe it as a necessary Caution, never to administer this Remedy either too hot or cold, but tepid: for either of the former will be injurious to the Bowels.

Injection of
them by a
Syringe.

^a *BARTHOLIN* (in *Hist. Anat. Cent. I. Obs. 76.*) has remarked the Death of a Patient to follow from the Administration of a Clyster cold.

Their Com-
position.

III. The Ingredients for this form of Medicine, with their Proportions and Uses, belong properly to the Physician. However, the Surgeon may learn from CELSUS, that in slight Cases simple Water may suffice; or else Mead, Ptisan, or a Decoction of Fenugreek, Mallows, and other emollient Herbs, may be used. To constipate the Bowels, a Decoction of Vervine^a: Sharp and gently stimulating Clysters may be made of Sea or Salt-water, with the Addition of Oil, Nitre, or Honey. When the Clysters is more acrimonious, it evacuates more; but it is not so long retained by the Patient. An emollient Clyster for a nephritical Case, or a Dysentery, may be made of warm Milk only, or a Decoction of Camomile, Paul's Betony, Honey, and Theriaca: and sometimes simple Oil may be injected for a Clyster, as GALEN did in a Cholic.

Their Uses.

IV. With regard to the Use of Clysters, they may be applied to Advantage;
1. In Costiveness, to excite a Stool: 2. To mitigate Pain in Cholics, Dysenteries, the blind Piles, Stone, or Gravel, &c. 3. To cause a Revulsion downward in lethargic Disorders, Apoplexies, Frenzies, and other Disorders of the Head: 4. To promote Labour, whether the Foetus be dead or living: and, to expel the Secundines where they are preternaturally retained.

Nourishing
Clysters.

V. Lastly, Clysters are sometimes used to nourish or support a Patient, who can swallow little or no Aliment, by reason of some Impediment in the Organs of Deglutition: for which Purpose may be used Broth, Milk, Ale, and Decoctions of Barley or Oats with Wine. Clysters were used for this Purpose by the Ancients long before the Moderns, as appears from CELSUS, who recommends Ptisan or Gruel; though there are many Physicians, who deny that they can be of any such Use as to nourish the Patient. Notwithstanding which we have a remarkable Instance, among others, of a Woman, that could not swallow, for the Space of 14 Days, during which Time she was supported by nourishing Clysters, as we are told by GARENGEOT in his *Chirurgical Operations*. To which we may add, that there really are lymphatic or lacteal Vessels in the large Intestines, capable of absorbing and conveying nutritious Juices to the Blood; as may appear, not only from Anatomy, but also from many Clysters being totally retained without any Discharge of their liquid Parts, as I have sometimes observed.

Smoky Cly-
sters.

VI. The Moderns have a new kind of Clyster, made of the Smoke of Tobacco, which appears to be of considerable Efficacy, and was introduced first by the *English*, after whom it has been used by several of the other *European* Nations. It is used chiefly when other Clysters prove ineffectual, and particularly in the Iliac Passion, and in the *Hernia incarcerata*: though it may be used for other Purposes, and is peculiarly serviceable in an obstinate Constipation or Obstruction of the Bowels. Various Instruments have been contrived and used for this Purpose: the first of which I believe was that of BARTHOLIN^b, which is followed by another of STISSER^c, formerly Professor at *Helmstadt*; and others have been also described by DEKKER and VALENTINE. See *Tab. XXXIV. Fig. 13*. But though the Machinery of these Authors differ in some respects, yet they all agree in this, that they have an Iron or Brass Capsula

^a Though CELSUS often mentions *verbena*, I imagine he intends corroborating Plants in general thereby, rather than the common Vervine.

^b In Hist. Anat. Cent. VI. Obs. 66.

^c In Epist. de Machinis Fumiductoriis, Hamb. 1686. edita.
marked

marked A, large enough to hold about half an Ounce of Tobacco, to which Capsula are fastened two Pipes. One of them marked B, is made of Bone, to be inserted into the Anus; and the opposite Pipe marked C, is made like that End of a Trumpet, which is applied to the Mouth, and being made of Ivory, the Patient, or an Assistant, may blow through it, and force the Smoke of the burning Tobacco E in the Capsula A through the Pipe B into the Anus. In this Manner the Smoke is to be blown up the Anus, till the Patient receives Stimulus enough to excite him to Stool: and if one Pipeful of Tobacco does not produce the desired Effect, the same may be repeated at Discretion. Or, if the common Tobacco is too weak, Recourse may be had to the strongest kind, termed *Canaster*: the Usefulness of which kind of Tobacco has been experienced to good Purpose by myself and others in obstinate or incarcerated Ruptures, when the common Tobacco has proved ineffectual; and when at the same Time the Patient's Case has been judged desperate, it has succeeded so well that I have had no Occasion to use the Knife. The Smoke of the Tobacco seems to produce this Effect, by stimulating the Intestine sufficient to make it contract, and withdraw itself into the Abdomen. For more upon this Subject, the Reader may consult GRAFFIUS and LANZONUS, in a professed Dissertation published upon the Subject at *Ferale*, An. 1691.

C H A P. CLXII.

Of Suppositories.

A Suppository is a kind of Cone made usually of Soap, Sugar, Allom, or a Piece of Tallow-candle about the Length and Thickness of a Finger, more or less in Proportion to the Size and Age of the Patient, into whose Anus it is to be introduced, in order to give a stool. This Form of Medicine is sometimes compounded of Ingredients adapted to the Patient's particular Case, as of Honey, Salt, Aloes, Colocynth, &c. If one Suppository is discharged without giving the Patient a Stool, it may be then proper to introduce a stronger, and after that a third or a fourth, till they produce the Effect required. They are by some lubricated with Oil or Butter, before they are introduced, that they may pass up the more easily: Others use a Lozenge of Sugar, or a Piece of Linen rolled up and dipt in Salt-butter, which, in some Cases, will make the Patient lax enough. For Ulcers of the Rectum, the best Suppositories are made of *Mel. Rosar. cum pulv. Mastic. Myrrh. vel Colophon.* But those compounded with *Euphrobium*, *Aloes*, and Substances which give a strong Stimulus, are advantageously used to promote a difficult Birth, or to expel the Secundines when they are preternaturally retained in the Uterus. For the Administration of this Remedy the Patient should be disposed in the same Posture as in giving a Clyster, as we directed in the preceding Chapter, after which the Suppository is to be gently protruded up the Anus with the Finger.

C H A P. CLXIII.

The Method of opening an imperforated Anus.

Nature and
Kinds of the
Disorder.

I. **W**E frequently meet with new-born Infants having no Perforation in the Anus, which are by the Physicians termed *Atræti*: which Disorder may be soon discovered by the Infant's discharging no Fæces for several Days after Birth, if it be not before observed by the Midwife in washing and cleansing the Infant^a. When the Case has been too long neglected, the Assistance of the Surgeon is frequently called in to no Purpose, as ROONHUYTS observes. The Disorder itself varies according to the Number and Thickness of Integuments which close up the Passage: but there generally remains some Mark or Sign, either of a Prominence or Cavity, which denotes the Part that ought naturally to be perforated. Sometimes a thin Membrane only obstructs the Passage; while, at other Times, the Parts are closed up with thick Flesh: both which are observed by SAVIARD, *Obs.* 3. But whatever be the Circumstances of the Disorder, if a Passage be not speedily made to discharge the Meconium, the Retention of that Excrement will excite Gripes, Vomiting, Jaundice, Convulsions, the Iliac Passion, and at length the Death of the Infant. When there is a Cicatrix, or some Mark indicating where the Perforation is to be made, the Operation is then not very difficult nor dangerous, especially if the Membrane be thin. But when such Marks are absent, and the Parts are closed by a thick fleshy Substance, the Operation is then in a great Measure dangerous, especially when the whole Rectum is in that Manner closed, even to the upper Part of the *Os sacrum*, as I have twice seen: for then the Operation is generally performed to no Purpose. ROONHUYTS (*Obs.* 2. *Part.* 2.) gives an Instance of the *Intestinum rectum* terminating in the Bladder. And sometimes in Girls it terminates in the Vagina; which is a deplorable Case.

Apertion
when the
Flesh or
Membrane
is thin.

II. When the Case appears remediable, and the Surgeon is determined to perform the Operation, the Infant is to be first held in a convenient Posture by an Assistant: after which the Membranes may be cautiously divided with an Abscess Lancet^b, by directing its Point into the Rectum; which may be known to have succeeded by the Efflux of the Meconium. This done, the Finger being dipped in Oil is to be passed into the recent Aperture, in order to examine the State of the Parts, and Vicinity of the Rectum; that then the Wound may be sufficiently enlarged either way, according to the Direction of the Intestine: after which the Operator should desist till the Infant has freed itself from the offending Excrement. Lastly, a large Tent, spread with some vulnerary Ointment or Balsam, is to be introduced into the Womb, with a Thread annexed to it, whereby it may be extracted if it should slip into the Rectum. A new Tent should be applied after every stool; and after a few Days Continuance, the Tent may be spread with some desiccative, instead of a digestive

^a Instances hereof may be seen in WIERUS, HILDANUS Cent. I. *Obs.* 73. ROONHUYTS *Obs.* 5. Part I and II. circa finem *Obs.* 1, 2, and 3. MAURICEAU in *Obs.* & SAVIARD *Obs.* 3, &c.

^b See SCULTETI *Armament. Chirurg.* Tab. 45. Fig. 8.

Ointment, as that *de Cerussa*: by which means the Part may be cicatrized and prevented from growing together for the future. HILDANUS^a introduces a leaden Pipe spread with *Ung. de Ceruss.* instead of a Tent, towards the latter End of the Cure; but to prevent the Pipe, or even the Tent, from slipping out, it is necessary to apply a Compress with the T Bandage. But if in two or three Days the Aperture, upon Examination, be thought too small, the Surgeon even then should enlarge it at his Discretion.

III. In this Operation it will not be very necessary to make an Apparatus of Instruments, Bandage, and Dressing, because in many Cases not the least Time should be lost, in order to preserve the Life of the Infant: yet it may be convenient to provide a Receptacle for the Fæces, during the Discharge of which the Surgeon may prepare his Bandage and Dressing.

A previous Apparatus unnecessary.

IV. When the Obstruction is made by a thick fleshy Substance, the Case is then more difficult and dangerous: however, it is better to try to save the Infant by performing the Operation, though it should prove ineffectual, than to let it perish without Help. In this Case the Operator is first to search with his Finger upon the Part to feel if he can discover the Passage to the Rectum, marking the Place with Ink, and making his Incision about half an Inch wide. If the Fæces do not follow, the Passage to the Rectum should be then searched for with the Finger, and the Wound enlarged accordingly but with Discretion, taking Care that the Edge of the Knife be directed towards the *Os sacrum*, to avoid wounding the Bladder in Boys, and the Vagina in Girls, concluding the rest of the Operation as before at N^o. II.

Division of the thick Flesh.

V. If the Surgeon can find no Appearance of the Rectum, it is then either absent or grown together, so that the Cure is either impracticable, or at least very uncertain. Yet the Infant ought not to be neglected, and therefore a Perforation should be made either with the Trocar, *Tab. XXIV. Fig. 2.* or with a narrow Scalpel, with which last the Opening should be enlarged discretionally, till the Fæces meet with a Passage. But if the Hæmorrhage should be very profuse, a Tent may be introduced with some Styptick, and the Remainder of the Dressing managed as before. About twelve Hours after, or twenty-four at the farthest, it will be proper to remove that Tent (unless it drop of itself) and replace it with another, spread at first with a digestive Ointment, and in a few Days with a desiccative. Or a leaden Pipe may be substituted in its room, till the Wound is quite healed. If, after all, the Intestine cannot be opened, there is no Possibility of saving the Infant; but he will be seized with violent Vomitings of the Fæces, and die in strong Convulsions.

When there is no Mark of the Intestine.

VI. ROONHUYNS, in his *Appendix of Observations*, pag. 2. Obs. 1. gives us an Instance of a Girl four Months old, who had indeed a Perforation in the Anus, but so small, that her Mother was obliged always to press out the Fæces with her Hands. But at length the Parts were so closed by the repeated Pressure as to admit no Discharge at all; upon which followed a Tumor of the Abdomen, with violent Pains, and a Fever, which threatened the Life of the Infant. He therefore first made an Opening with an Abscess Lancet, and then enlarged it with Scissars; by which means a large Quantity of Fæces were discharged, the Tumor of the Abdomen subsided, the other Symptoms disappeared,

Some Observations.

^a In Cent. I. Obs. 73.

and the Wound was healed, as we directed at N^o. II. SCULTETUS also gives us a Case of the same Nature in *Armament. Chirurg. Obs.* 71. In some Girls who have their Anus imperforated, the Fæces have a Passage through the Vagina; in which Case the Parents would rather let the Patient be thus miserably afflicted all her Life, than suffer the Surgeon to perform his Operation.

C H A P. CLXIV.

Of a Prolapsus Ani.

Nature of
the Disorder.

I. **T**HE *Intestinum rectum* is frequently inverted or prolapsed to such a Degree, both in Adults as well as Infants, that it appears near a Hand's-breadth hanging out of its natural Situation. We have a remarkable Instance of this Disorder given us by MURALTUS, in a Woman whose *Rectum* was prolapsed in a difficult Labour near the Length of one's Arm: and SAVIARD mentions a Prolapsus of this Part in an Infant to the Length of a Foot. The Disorder is not only troublesome, but also extremely painful and uneasy, to such as lead a laborious or itinerant Life; and sometimes an Inflammation, Tumor, Gangrene, or Cancer seizes the Part: an Instance of which we have at the latter End of MEEKREN'S *Obs. Chirurg.*

Cause and
Prognosis.

II. The Cause of this Disorder may be great Weakness or Relaxation in the Rectum, which frequently happens to cross and clamorous Children, or from a Tenesmus, violent Pains with the Piles, a Dysentery, a Stone, or Ulcer in the Bladder, a difficult Expulsion of the Birth, or of the Fæces, &c. The Disorder is not difficult to cure when recent, and when the Patient is not of a weak and ill Habit: but, in the contrary Circumstances, to effect a perfect Cure is next to impossible. If a hard Swelling, a Gangrene or Cancer should infest the Rectum, the same Treatment is to be used as proposed for Tubercles and a Prolapsus of the Vagina, *viz.* the Application of discutient and emollient Remedies; and, if they prove unsuccessful, an Extirpation of the morbid Part.

Reduction.

III. When a Surgeon is called to a Patient in this Disorder, his Business is first to restore the Part immediately to its natural Situation, before he enquires after its Causes, or prepares his Bandage and Dressing: for the longer the Intestine continues prolapsed, the Tumor and Inflammation is generally so much the more increased, and consequently the Cure proportionably more difficult. In order to reduce the Intestine, the Patient is to be first advantageously disposed in a prone Posture on a Bed; and the Rectum being fomented with warm Wine, or its Spirit with Milk, or even warm Water applied with a Sponge or Linen Cloths, it is to be then returned into its natural Position with the two Fore-fingers covered with fine Linen, in the same Manner as we have directed for returning the prolapsed Intestines in Wounds of the Abdomen. This Business may be generally performed without much Difficulty, when there is no concomitant Tumor or Inflammation. But if they are present, in order to remove them, the Patient should be bled, and the Parts fomented till the Tumor subsides, and a Reduction may be performed, which is sometimes no easy Matter, requiring the Assistance of more than one Surgeon, as SAVIARD takes

takes notice in *Obs.* 14. In some Patients who are of a weak Habit, and have had the Disorder on them a considerable Time, the Rectum will subside or prolapse again after its Reduction whenever they go to stool: but then it may be easily replaced again, either by themselves, or the Assistance of a Surgeon, who should endeavour to prevent a Relapse of the Disorder, by strengthening the Parts with proper aromatic and astringent Applications.

IV. It is generally more difficult to prevent a Relapse, than to replace the Rectum. But for the first, it is to be attempted by the Application of two thick Compresses; one oblong, applied betwixt the Thighs and Nates, the other square, traversing the former upon the Anus, both which are to be retained with the T Bandage. The Compresses should be moistened in some proper Decoction, rather than applied dry; which Decoction may be made *ex Rad. Bistortæ, Tormentillæ cort. granator. quercus, gallis, foliis Quercus, &c.* prepared by boiling them in red Wine. The Use of this Decoction should be also repeated, when the Disorder returns upon the Patient's walking, straining, or the like. When the Disorder is still more obstinate, Relief may be sometimes had from the Application of a strengthening *Diapasma ex Mastice. Colophon. Terr. Japonic. Sang. Dracon. &c.* assisted with a Compress and Bandage. For the same Purpose may be also used strengthening Clysters made of a Decoction of aromatic and astringent Herbs in red Wine, by the repeated Application of which the Disorder may be generally cured.

Retention.

V. If all the Means before mentioned prove insufficient, a Suffitus may be used *è Mastice. Thur. succin. piper. nigro, &c.* the Fumes being conducted thro' a Tunnel in the Bottom of a Chair, forbidding the Patient astringent and drying Meats, and directing him to avoid sneezing, vomiting, and all violent Exercise, till the Cure is confirmed. DIONIS, and some others, think a Relapse of the Disorder may be prevented upon going to stool, if the Patient eases himself upon a Seat, which has a Hole no bigger than two Finger's Breadth, or about the Size of a Crown Piece. Some introduce a leaden Pipe into the Anus, to prevent its Relapse. But after all, when the Disorder has continued a long Time in a weak Habit, the Patient can frequently find no Benefit, but by a constant Retention with Compress and Bandage, which are to be constantly worn.

Treatment of difficult Cases.

C H A P. CLXV.

Concerning Tumors of the Anus, such as the Condyloma, Crista, Ficus, and Fungus.

I. **T**HE lower Part of the Rectum is frequently infested with Tumors, as well in its external as internal Part, which, from their different Size and Figure, are distinguished into *Condylomata, Cristæ, Fici, and Fungi*. But they generally agree in this particular, that they proceed from a redundant and vitiated Blood, stagnating in the hæmorrhoidal Vessels, and particularly in the Glands of this Part, whereby they are produced much in the same Manner as Polypus's in the Nose. Therefore those who are subject to the Piles, are more frequent-

Their Nature and Kinds.

ly troubled with them than others. These Tumors are frequently not only troublesome, but also very painful to the Patient, rendering him incapable of sitting or walking. Those Tumors of this Kind are the most malignant, which, according to CELSUS (*Lib. V. Cap. 28. N^o. 14.*) are in *Locis obsœnis*, as they frequently proceed from the venereal Disease: and therefore the Ancients, who were ignorant how to cure that Disorder, denominated them to be of the worst Kind.

Treatment.

II. The Cure of these Tumors may be prosecuted according to the Directions which we have before given for other Tumors and fleshy Excrescences. *Chap. XXVII. and CL.* The Root of the Tumor ought to be divided, if it be not over large, either by Ligature, the Scissars, or Knife. If the Root is too large to be conveniently separated by Ligature, it may be performed either with the Scissars or Knife, holding the Tumor fast with a Hook or Pliers. The Wound being permitted to bleed in Proportion to the Strength of the Patient, in order to prevent a consequent Inflammation: Then, after stopping the Hæmorrhage with proper Styptics, the Wound may be dressed, at first with scraped Lint, Compress and Bandage: but afterwards it may be proper to apply some vulnerary Balsam, desiccative Ointment, and, lastly, dry Lint, in order to cicatrize and heal the Part. But Care should be taken, in the subsequent Dressings, to remove any small Parts of the Tumor that may yet remain behind, either by cutting them off with Scissars, or corroding them with blue Stone, or *Lapis infernalis*. I have even sometimes known a total Separation of the Tumor made by the Application of Caustics, and with good Success, if Care be taken to defend the Anus and its Sphincter from Injury. It was the Practice, or rather Advice of the Ancients, to reduce these Tumors by the actual Cautery, when they would not give way to the potential or Caustics; see CELSUS *Lib. VI. Cap. 18. N^o. II.*

C H A P. CLXVI.

The Method of treating the bleeding Piles.

The Piles,
and their
Treatment.

I. IN some Men the Mouths of the hæmorrhoidal Veins in the Rectum discharge a Quantity of Blood at the Anus, either at certain periodical or un-stated Times, being frequently attended with Pain and Tumor of the Parts. This Disorder is by Physicians termed the *open Piles*, or hæmorrhoidal Flux; which, if moderate, is healthy, and ought not to be suppressed, since the redundant and noxious Parts of the Blood are hereby discharged from the Body, many of whose Disorders, as the Hyp, Melancholy, Madness, Gout, Asthma, &c. are hereby prevented or relieved, according to the Observation of HIPPOCRATES, *Seet. 6. Aph. 9. and 22. CELSUS Lib. 6. Cap. 18. N. 9.* But when too much Blood is this way lost, it weakens the Patient, and may, by Degrees, bring on a Dropsy, Cachexy, and other chronical Disorders, which may render it absolutely necessary to restrain, or at least moderate the Flux. When the Ancients found astringent Medicines insufficient for their Purpose, they cauterized the bleeding Veins with a hot Iron, in the Manner described by CULPÉTUS, and

and represented in *Tab. XLIV.* of his *Armament. Chirurg.* Others tied up the Mouths of the bleeding Vessels, by passing round them a crooked Needle and Thread. But the Moderns, judging the Method of the Ancients too cruel or severe, and often pernicious, generally leave the Case to Nature, except when the Discharge is profuse, and then they treat the Patient not with Astringents, but rather with balsamic and incrassating Medicines internally, not neglecting the Lancet, when Bleeding is necessary.

II. Though there are many Patients desirous of having this Flux not only moderated, but even stopt, the prudent Surgeon ought not to countenance their Request; before he has warned them of the forementioned Disorders, or even Death, which they may, by this means, incur. But if they persist in their Resolution, or if the Flux exceeds its due Bounds, it may be then convenient to stop up some of the Mouths of these bleeding Veins, leaving only a few of them open, as HIPPOCRATES directs in *Aphor. 22. Sect. 6.* In this Case therefore the Treatment may be as follows: first, bleed plentifully by the Lancet, then give laxative or cooling Purges; and, lastly, a Clyster may be given five or six Hours before the Operation following.

III. The Patient being properly disposed upon a Bed, and his Legs held by two strong Assistants, in such Manner that the Surgeon may have free Access and Inspection of the Parts; he is then to tie up the bleeding Tubercles with a Needle and Thread, cutting off those Parts which are preternaturally distended beyond the Ligature, taking Care, at the same Time, to leave a few of the smallest Veins open, as we before observed. Lastly, if the Blood does not stop of itself after the Vessels have bled a short Time, Styptics may be then applied with scraped Lint, Compresses, and the T Bandage; and, in the subsequent Dressings, may be used cicatrizing and vulnerary Unguents or Balsams: and, if any thing be observed yet remaining, it may be removed either by the Scissars or Caustic. Sometimes these bleeding Tubercles are seated so high in the Rectum as to be inaccessible; and then the Ancients recommend the passing up of an actual Cautey in a Cannula to restrain the Flux. But as this is a Practice too severe and dangerous, it is, in my Opinion, better to use the *Speculum Ani*, *Tab. XXXIV. Fig. 15.* whereby the Parts may be dilated so as to tie up or intercept the Tubercles in a Loop or Knot: by which Means, with the Application of proper Internals, a profuse Hæmorrhage in this Part may be restrained, without having recourse to that severe Practice of the Ancients.

C H A P. CLXVII.

The Method of treating the Blind Piles.

I. **I**T is observable, that the Veins spent upon the Rectum and Anus are sometimes so much distended with Blood, as to be very painful and resemble Tubercles, either like Peas, Grapes, Wall-nuts, or Eggs, and sometimes they are extended longitudinally like Fingers, without discharging any Blood. These are by Physicians termed *Hæmorrhoides cæcæ*, or the blind Piles, which

they distinguish from other Tubercles of the Anus by their Colour and Resistance to the Touch; for these, being distended with thick Blood, appear livid, and, being pressed with the Finger, feel like little Bladders distended with some Liquor: which two Circumstances are not observed in the other Tubercles of this Part, considered in *Chap. CLXV.* Sometimes these distended Vessels are soft and flaccid, giving little or no Pain: others are tense, painful, and inflamed, tormenting the Patient often to such a Degree, that he can neither sit, stand, nor walk, often fainting with the Extremity of Pain, and more afraid than in real Danger of Death.

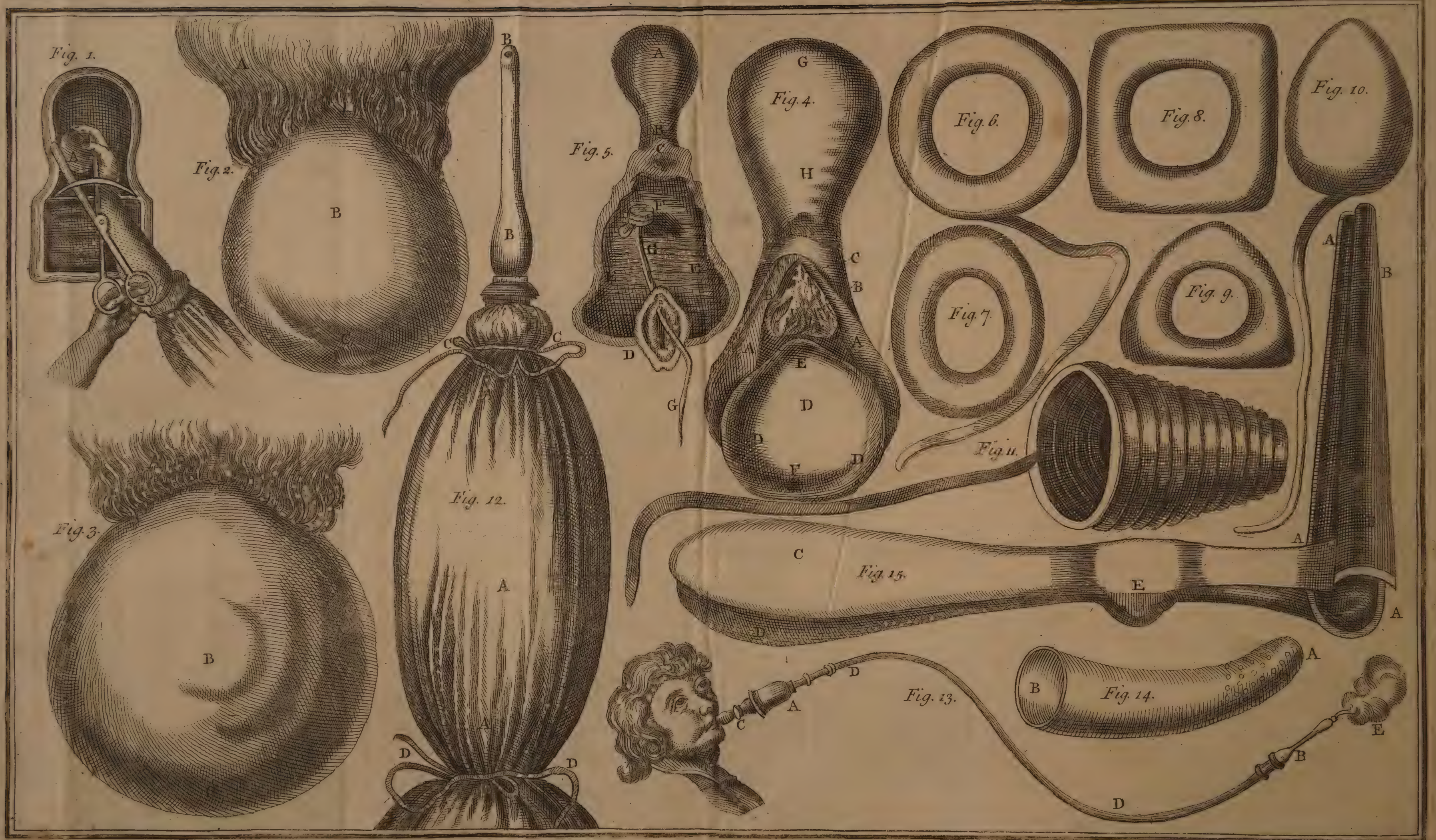
Causes. and
Prognosis.

II. The blind Piles most frequently occur in those Men who are costive, and of a sanguine plethoric Habit; to which we may add in Women, an Obstruction of the Vessels from any Pressure of the Infant in Gestation, or Suppression of the Menfes. These distended Veins become at last so turgid, as to burst, and discharge their Contents, and then they are no longer the *Hæmorrhoides cæcæ*, but *apertæ*, sometimes bleeding to such a Degree, as greatly to endanger the Patient's Health. In the blind Piles the Parts are sometimes so much distended, and the Pain so intense, as to cause a Spasm or Cramp of the Sphincter-muscle, which is sometimes so forcibly contracted with excruciating Pain, as not to admit even the Administration of a Clyster. Sometimes these distended Vessels, if their Contents are not dispersed in four or five Days time, degenerate into troublesome and itching Ulcers, and not unfrequently do they give Birth to an Abscess, or a stubborn Fistula.

Treatment.

III. When the blind Piles are small, and not very troublesome, they need not the Care of the Surgeon: but when they are numerous, or large, incompassing the Anus like Grapes, and by their Pain molesting the Patient, so that he can neither sit, ride, walk, or go to stool; in that Case, unless they yield to the Application of Spirits of Wine, the most speedy Remedy is to make a Ligature upon those which are most painful and large, whereby they will in Time separate. But if there is also a violent Inflammation, it will be first proper to bleed, and to use cooling and laxative Medicines internally, with a proper Diet, while externally may be applied discutient and emollient Fomentations and Cataplasms. The Patient may be sometimes eased by anointing them with *Ung. Nutrit.* fresh Butter, Oil of Almonds, &c. and frequently the Application of Linen Rags, dipped in warm Spirit of Wine, with emollient Clysters, are highly serviceable. If they do not take effect, Leeches may be applied to the turgid Veins, in order to remove their Tension, and discharge their Contents, which may be also effected by Scarification with a Lancet, when the Parts are either inflamed, or Leeches are not at Hand. Then, after letting them bleed in Proportion to the Patient's Strength, the Dressings may be made with scraped Lint, Compresses, and the T Bandage, which are to be renewed every Day, as long as the Disorder continues. What speedy Relief may by this way be had, no one can imagine but those who have experienced. Sometimes the Piles are seated so far within the Rectum, as to be inaccessible without dilating the Sphincter by the *Speculum Ani*, *Tab. XXXIV. Fig. 15.* and, upon their appearing, by the Help of this Instrument, they may be either scarified with a Lancet, or divided with the Scissars, in order to discharge their thick Blood, which will abate the Inflammation, Tumor, and Pain.





Pain. Sometimes, by this Treatment, the blind will turn to the open, or bleeding Piles, attended with a considerable Flux, which, however, ought not to be suppressed when within the Bounds of Moderation, as it may conduce much to the Patient's Health, and the Prevention or Removal of many obstinate Disorders, such as the Gout, Gravel, hypochondriacal Melancholy, &c. Upon which Account many Physicians recommend and excite this Evacuation: but as it must be attended with many Inconveniences, and often bad Consequences, I should rather approve of promoting the Cure of those Diseases by other Evacuations.

IV. In order to prevent or relieve the blind, or the bleeding Piles, nothing is more conducive than a spare and temperate Diet, with Bleeding, Spring and Fall, and oftner if required. Internally may be taken a Powder or Decoction *ex Millesfol.* drank like Tea, carefully avoiding every thing which heats the Blood, and constipates the Bowels; of which kind are Aloes, Myrrh, Saffron, &c. with Wine, Anger, violent Exercise, profuse Venery, and Riding, &c. Upon the first Appearance of the Piles with any Uneasiness, cooling and diluting Medicines should be immediately employed with Laxatives and proper Diet, while externally may be used Fomentations and Cataplasms, and, in urgent Cases with most acute Pains, Leeches, or Scarifications with the Lancet, as we before advised.

An EXPLANATION of the THIRTY-FOURTH PLATE.

Fig. 1. Represents the *Uterus* with a *Mola* adhering thereto, as they were observed by SICISMUNDA, in a Lady, from whom that expert Midwife extirpated the foreign Body with Success by a Pair of large and obtuse-pointed Scissars. See her *Treatise de Arte obstetricandi*, in Præf.

Fig. 2. Exhibits a *Prolapsus Uteri* without Inversion. AA denote the Pudenda; B the *Uterus* appearing externally; C the internal Mouth of the *Uterus*, which here appears on the out-side the Pudenda.

Fig. 3. Shews a *Prolapsus Uteri* with an Inversion thereof. AA the Pudenda; B the inverted *Uterus* hanging down, without any Appearance of its internal Mouth shewn by C in the preceding Figure; which, together with this, are taken from RUYSCH. C here denotes the lower Part of the inverted *Uterus*.

Fig. 4. Represents a particular Kind of *Prolapsus Uteri*, as it was first denominated; though it was in reality no more than a *Prolapsus* of the *Vagina*, according to the Observation of WIDENMANNUS in *Ephem. Nat. Curios. Cent. VIII. Obs. 98.* where the History of the Case is more largely delivered, and the Figure of the Parts as big as the life. In our Figure AA denote the *Labia Pudendi*; BB the Nymphæ; C the Clitoris lodged betwixt the two former; DDD the prolapsed *Vagina*, resembling indeed the *Uterus*, but in reality no more than a Tumor formed by the Relaxation and Subsidence of the interior Coat of the *Vagina*; E its Root in the *Vagina*; F its Base with the Mouth resembling the internal *Mouth of the Uteri*; G, H, the *Uterus* itself seated in the Pelvis. We take no notice here of the Ligaments, Fallopian Tubes, and *Ovaria*, being impertinent to our Design.

Fig. 5. Is taken from the Chirurgical Observations of MEEKREN, to shew a Prolapsus of the Vagina and Uterus together. A the Uterus; B its Neck; C its internal Mouth; D the Pudenda; E E the Vagina divided and laid open; F the Root of the Tumor appearing without the Vagina like a *Prolapsus Uteri*; G the Ligature with which the Root of the Tumor was compressed during its Removal.

Fig. 6, 7, 8, 9, and 10. Represent several Sorts of Pessaries: the first of which is round like a Ring, to which are fastened Strings for extracting it out of the Vagina. That at *Fig. 7.* is of an Elliptic or oval Figure, at *Fig. 8.* quadrangular, and at *Fig. 9.* triangular; each of them being perforated in the Middle, and formed out of Cork or Wood waxed over, or else of Silver or Gold made hollow, for the more opulent. The last of them at *Fig. 10.* is solid like an Egg, but less convenient than the former.

Fig. 11. Is an elastic Pessary of Steel-wire, turned into a conical Worm as described by GOELICKIUS. This has also a String fastened to it; but if there was another fixed to the opposite Side, it might be drawn out so much the more easily.

Fig. 12. Represents the Machinery commonly used with the *German and Dutch* People for injecting Clysters. A A the Bladder of Liquor, which is large enough to hold a Pint; B B the Pipe of Bone or Ivory to transmit the Liquor into the Intestines; C C the Ligature immediately above the Pipe, which is to be united when the Pipe is in the Patient's Anus; D D the Ligature which secures the Orifice, whereby the Clysters was poured into the Bladder.

Fig. 13. Exhibits the Machine for giving a *Clyfma fumosum* of Tobacco. A the Brafs Bowl or Capsula in which the Tobacco is burnt; B the Ivory Pipe to be passed into the Anus; C the Pipe, which, being in a Person's Mouth when the Tobacco is on Fire, the Smoke E is thereby blown through the flexible leathern Pipe D D into the Patient's Bowels.

Fig. 14. Denotes a Brafs Pipe for conveying Fumes or Vapours into the Vagina and Uterus. A the upper Part, which is full of small Holes, and to be inserted into the Vagina. B the lower Part, open, for receiving the Pipe of the Funnel.

Fig. 15. Is a *Speculum Ani*, or Instrument to dilate and inspect the Anus and Vagina in Disorders of those Parts. It consists of a hollow Cone or Beak, whose two Sides are marked A A and B B, which, being gently warmed and lubricated with Oil, are then passed into the Anus or Vagina; and, by pressing together the two Handles C and D, the Sides of its Cone are thereby gradually separated, and dilate the Parts for Inspection; E the Hinge, is in Manner of GINGLYMUS.

C H A P. CLXVIII.

Of Fistulæ in the Anus.

I. **T**HOSE Ulcers in or near the Anus and Rectum, which are recent, and afford a *pus laudabile*, or uniform Matter, are termed Abscesses: but those which are more inveterate, callous, and afford a thin foetid Matter, such have been generally denominated Fistulæ by the Ancients, and are distinguished by them into various Species, according to their different Symptoms^a. Some Fistulæ of the Anus are small and recent; others are narrow, and penetrate deep; and others, again, are inveterate, and so large, that having destroyed the Skin and Adepts, they expose the Rectum to View. Sometimes a recent Fistula has no great Callosity; only the Margin of its Entrance is a little indurated. Sometimes the Fistula proceeds in a single and straight Course; and sometimes, it is crooked, and, in a Manner, divided into Branches. But before we proceed to a further Examination of this Disorder in all its Species, we shall first distinguish three Kinds of these Fistulæ remarked by the most expert Surgeons. Of the first Kind are those which do not perforate the Anus or Rectum, but have only a single or double Opening externally near the Anus, by which they discharge a thin foetid Matter, and are encompassed with callous Lips. And these are called external Fistulæ. To discover how deep, and what Parts the Sinus of the Fistula penetrates, a Search is to be made with the Probe, and one of the Fore-fingers, passing the first into the Sinus of the Fistula, and the other, lubricated with Oil, into the Anus; by which Means the Probe, pressing against the Finger, will discover whether there be any opening into the Intestine, or how thick the intermediate Partition remains^b. Sometimes the Fistula is so crooked, that the Probe cannot follow it^c; and so we cannot be satisfied, whether the Sinus is deep or ramified: in this Case therefore it may be proper to inject the Fistula with warm Milk by a Syringe, observing how much it contains, and whether any of it escape into the Rectum, which will discover whether the latter be perforated or not. The second Kind of Fistulæ are those which have several Openings, and at least one of them perforating the Rectum, the rest terminating outwardly near the Anus, as represented in *Tab. XXXV. Fig. 1. CC*; And that the Intestine is thus perforated, the Surgeon may be satisfied, if the Head of the Probe touch his Finger in the Patient's Anus, without any intervening Substance; or if, on the other Hand, a Clyster or Milk being injected by the Anus, some Part of it escapes through the external Orifice of the Fistula, through which the Fæces, Flatus, and Worms are also sometimes discharged. The third and last Kind of Fistulæ in the Anus, are those which perforate the Rectum internally without any exterior Opening, as is represented in the forecited *Fig. FG*. Which last Kind are denominated occult, blind, or

Diagnosis
and kinds of
Fistule.

^a See HIPPOCR. *Lib. de Fistulis*; and CELSUS, *Lib. VII. Cap. iv. Sect. 4.*

^b Which has been observed by ÆGINETA, *Lib. VI. Cap. lxxviii.*

^c The Finger should always be first passed into the Anus in probing a Fistula; or else you may be in Danger of perforating the Rectum when there is no opening into it.

imperfect Fistulæ; the two former Kinds being tumid, manifest, or compleat. The occult Fistulæ are discovered by a Discharge of purulent, or corrupt Matter by the Anus, the Patient being sensible of a Hardness, Tumor, and Pain, without any external Opening near the Rectum. The internal Opening of the Fistula is generally near the Sphincter of the Anus; but sometimes they open so high into the Rectum, as to be both invisible and inaccessible, both which may be seen in *Tab. XXXV. Fig. 1.* But whatever be the Condition of the Fistula, its opening should be searched for with the Finger *in Ano*, lubricated with Oil or Butter: and when that is insufficient, may be used the *Speculum Ani*, or other convenient Instruments. But when the Sinus of the Fistula gives some external Mark, either by Tumor, Hardness, or the like, the Surgeon need not, in that Case, give himself much Trouble in searching for the internal Opening.

Other kinds
of Fistulæ.

II. Those Fistulæ which perforate the Intestine with one Aperture, and appear externally with another, are usually termed perfect or compleat; while those which have but one opening are termed imperfect or incomplete. This last kind of Fistulæ are again distinguished by the Difference of their Opening into external and internal. Fistulæ are again distinguished into simple and compound. Of the first kind are those which perforate only the Integuments and Intestine: and of which some incline to one Side of the Nates; others, forward, to the Perinæum, Urethra, Bladder, or Scrotum; and others again, backward, to the *Os coccygis* or *sacrum*. The Compound are those which eat into the *Os sacrum*, or *coccygis*, Bladder^a, Urethra, Scrotum, and in Women the Vagina, to such a Degree, that the Fæces of the Bladder and Intestines are frequently intermixed or confused; and sometimes the Sinus of the Fistula penetrates into the Cavity of the Abdomen, which is of all the very worst kind. Some Fistulæ are small, and very tolerable, with little or no Uneasiness; while others are so extremely painful as to excite a Fever, or by their too copious Discharge, extenuate and destroy the Patient. But when the Discharge is moderate, it may be sometimes serviceable in preventing other Disorders; as I remember lately in a Man, whose Fistula being cured, he fell sick of the Gout, of which he was again freed upon its being opened. Some Fistulæ have their Openings so very small, as to be scarce discernible either with the Probe or otherwise: and some, again, have different Appearances, taking either an oblique Course, or passing in a straight Direction, either single or ramified, deep or superficial, &c. So that it is frequently no less difficult to discover all the Circumstances of this Disorder, than to accomplish its Cure.

Exploration
of these Fi-
stulæ.

III. In order to probe and examine a Fistula of the Anus, the Patient is to be first disposed in a proper Posture; and, after distending and holding the Nates asunder by an Assistant, the Surgeon then introduces his Fore-finger, lubricated with Oil or Butter, into the Patient's Anus; always observing this Caution, not to pass his Probe far into the Fistula before he has thus introduced his Finger. Otherwise, he might be in Danger of making a Perforation into the Intestine, by pressing too forcibly with his Probe upon a weak or extenuated

^a *Fistulæ* penetrating into the Urethra and Bladder have been observed, long before myself, by ALBUCASIS, Part II. Chap. lxxx.

Part. When the Probe is thus pressed, the Nates should resume their natural Situation, that the Angles of the oblique Sinuses may not impede the Progress of the Probe: and when thus cautiously depressed, and gently turned round on every Side, it meets with a Resistance, we may reasonably conclude there terminates the Fistula.

IV. The most general Cause of this Disorder is usually an Ulceration or Abscess, formed in the Piles in or near the Rectum, and especially in the large Quantity of Fat, which invests that Intestine. But sometimes the Cause of such an Abscess may be a Contusion or Wound from a Fall, or Blow, an Inflammation, Dysentery^a, difficult Birth^b, immoderate Riding on Horseback, the Venereal Disease, and many other of the like Causes. It has been an Observation made by many of the Camp-Surgeons and Physicians, that Troopers, or the riding Part of an Army, are very frequently troubled with this Disorder, especially after long Marches in hot Weather. An Abscess thus formed may degenerate into a Fistula, by the Neglect and Bashfulness of the Patient, especially if it be not timely opened and cleansed from its foul Contents; by the Retention and Acrimony of which the adjacent Fat and Intestine are at length corroded or ulcerated; and, in process of Time, become callous, and indurated so as to be incurable by any Means without the Assistance of the Knife. A remarkable Instance of which we have in the *French King Lewis XIV.* who could not be cured by all the Skill and Endeavours of the most expert Surgeons and Physicians, till he was cut. Therefore the Knife should be immediately applied to discharge the Contents of an Abscess in Time, or even when there is Matter perceived in an Inflammation, either by feeling with the Finger internally, or by its pointing externally.

Their Causes and Effects.

V. The Cure of this Disorder is the more difficult, as the Fistula is larger, deeper, and has consumed the Fat, with Part of the Rectum and its Sphincter-Muscle; and as its Sinus is more callous, and the Patient weak^c, or advanced in Years: which, when they all concur together, may render the Case desperate and incurable. In particular, the Fistula is more dangerous as its internal Opening is seated higher up in the Rectum, where the Blood-vessels are very large, so that the Operation of cutting may induce a fatal Hæmorrhage, as hath been sometimes observed^d, it being hardly possible to tie up the Vessels, or stop their Bleeding by the Pressure or Resistance of some hard Body, or by the Application of Styptics. And, to say the Truth, if the internal Orifice of the Fistula is not within Reach of the Finger, the Operation of cutting cannot well be performed without hazarding the Life of the Patient; and without that Operation there are but little Hopes of obtaining a Cure: so that GARENGEOT judiciously advises the Surgeon in this Case, to refrain from the Knife, which might incur a fatal Hæmorrhage. And sometimes, even when the Operation

Prognosis.

^a As MARCHETTI has observed in *Lib. de Fist.*

^b See TULPIUS *Lib. IV. Cap. xl.*

^c SAVIARD gives us the History of a weak Patient, who died the Day after the Operation, in his *Obs. 50.*

^d See SAVIARD *Obs. 49.* And PALFYN, (*Cap. XX.*) gives us an Instance, in which there was no Blood discharged from the Wound, but it all passed into the Patient's Intestine, so that he bled to death.

has been performed, we find so many and so deep Fistulæ, affecting either the adjacent Bone, Bladder, Urethra, or Vagina, in so desperate a Manner, as to render the Success thereof very doubtful and precarious. Abscesses of the Anus, which frequently return again, are to be cured in the same Manner with Fistulæ; that is, by dividing the Anus or Rectum with the Sphincter-muscle. In a Woman with Child a Surgeon ought not to undertake the Cure of a Fistula *in Ano* till she is first delivered; otherwise he may be the Occasion of her Miscarriage and Death, as MAURICEAU observes: and if the Fistula penetrates into the Bladder, Uterus, Urethra, or the adjacent Bones, the Disorder hardly ever admits of a Cure. The blind or occult Fistulæ are also much harder to Cure than the manifest or external and compleat. But, on the contrary, if the Fistula be recent and external only, or even compleat, as in *Tab. XXXV. Fig. 1. CC*, the Cure may probably succeed, provided there is but a small Portion of the Fat, Rectum, or its Sphincter consumed; the Sinus being simple, with little or no Callosity, and affecting none of the considerable Parts beforementioned; and particularly, if at the same Time the Patient be young, and of a good Habit: but even then the Cure is to be expected more from the Knife, than the Application of Medicines. The same Judgment is to be also formed of the occult or internal Fistulæ, which open not far from the Sphincter-muscle, as in *Fig. 1. FG*. Small Fistulæ, which open externally, may be continued to Advantage, and without much Trouble to the Patient, in such Habits as have been long accustomed to a Discharge of pernicious Humours thereby; so that by keeping them open with a proper Regimen, the Patient sometimes acquires a healthy old Age, as we have observed in treating of Ulcers. When an external Fistula or Abscess has so consumed or extenuated the Intestine, as to leave but a very thin Partition between the Cavity of the Fistula and Intestine, the Disorder is not then curable without dividing the Sphincter and Rectum, as we shall presently direct, notwithstanding the Intestine be imperforated by the Ulcer or Fistula^a. But if the Partition or Sides of the Intestine appear thick and firm, a Cure may be then sometimes obtained without the Operation of cutting. Recent Fistulæ, when they proceed from, or are accompanied with the venereal Disease, are generally cured by the Use of Mercury^b, without cutting.

Preparation
and Posture
of the Pa-
tient.

VI. Having described the Nature and Kinds of Fistulæ in the Anus, we shall next proceed to deliver an Account of the Preparation, or Things previously necessary to their Treatment and Cure. We shall begin with the perfect or *compleat* Fistulæ, as they are introductory to the rest. For the Cure of a compleat Fistula, indicated and encouraged both from its own Nature, and the Patient's Health and Habit of Body, &c. (as at *Seet. V.*) the first thing to be done here by the Physician or Surgeon, is to prepare the Patient to receive so great a Change, and particularly by Bleeding and Purging a few Days before the Operation: but in weak Habits, they ought to be omitted, and the Patient rather supported with a strengthening Diet, and Exhibition of Alteratives, to correct the State of his Juices according as they are indisposed. A few Hours

^a As SAVIARD takes Notice in *Obs. Chirurg.* 49.

^b See LE DRAN, *Obs.* 85.

before the Time fixed for the Operation, a Clyster should be administer'd to empty the Intestines, that their Contents may neither offend the Operator, nor the future Discharge of them make it necessary to take off all the Dressings before the due Time; and, in the next Place, the Patient should make water a little before the Operator begins, that the Bladder by its Distension may not impede the Operation, nor be itself liable to be injured. As for the Posture of the Patient, it may nearly coincide with that for probing the Fistula at Sect. III. lying in a prone Posture with his Thighs divaricated. Indeed the Ancients, and particularly *ÆGINETA*, recommend a supine Posture: and the modern *French Surgeons*, according to the Account of *GARENGEOT*, prefer disposing the Patient in the same Manner as for a Clyster, lying upon his Side near the Edge of the Bed, with his Thighs drawn up towards his Abdomen. But though this Position may be convenient enough, in many Cases, for performing the Operation, yet I have several Times found, that the particular Disposition and Course of the Fistula rendered the first Posture most convenient, both for examining and cutting the same.

VII. When the Patient is fixed in a convenient Posture, the Surgeon's next Business is to chuse a fit Instrument for performing his Operation; which, among the Ancients, was a particular Sort of Knife, in the Form of a Sickle, denominated (from the Disorder and its Office of cutting) by the *Greeks*, *Syringotomus*. The most usual Kinds of this Instrument are represented in *Tab. XXXV. Fig. 4, 5, 6, 7.* where AB denote the sharp Edge of the Instrument for cutting, BC the obtuse or Probe End of the Instrument, which ought to be flexible, DD the obtuse Back of the same Instrument, which is convex. Notwithstanding these Instruments are rejected as useless by many of the Moderns, I am yet convinced, by Experience, that they may be frequently used to Advantage for cutting those *Fistulæ*, which do not run deep, or are only superficial. When a *Syringotomus* has been chose sizeable to the Depth of the Fistula, in order to use it, the Fore-finger of either Hand is to be first lubricated with Oil, and passed into the Rectum; and then the Probe End of the Instrument, marked C, is thrust in at the external Aperture of the Fistula, till it reaches the Finger in *Ano*, whereby it is to be also inflected, and brought out again at the Anus: after which, taking hold of each End of the Instrument, it is to be drawn forward, so as to divide the intercepted Parts of the Anus and Rectum; by which Means too the Sphincter Muscle may be divided without Damage to the Patient. (See *SCULTETI Tab. XLV.^a*) But as the superior Aperture of the Fistula in the Rectum is generally callous, which Callosity cannot be removed in this Method of cutting, and as without that there can be no Cure performed; it may be therefore proper, in such a Case, (either then, or the next Day, if there be a great Effusion of Blood) to cut the Remainder, which is higher up in the Intestine, with a pair of Scissars.

The Operation for complet *Fistulæ*.

VIII. But some of the more modern Surgeons think, that the falciform Knife with an obtuse Point (represented in *Tab. V. Fig. 3.*) may be more ad-

More modern Instruments for cutting.

^a There are many, who imagine [after *ALBUCASIS*, Part II. Cap. lxxx. and the Ancients] that a Division of the Sphincter-muscle will be attended with an involuntary Discharge of the Fæces; but repeated Experience assures us, that, on the contrary, the Muscle may be safely incised, and healed, without being attended with any such Consequence.

vantageously used for cutting Fistulæ in this Part. But I cannot be entirely of their Opinion: for Experience assures us, that it can be only used with Success in Fistulæ which are superficial, and which do not run deep. In such Fistulæ I have indeed happily used this Sort of Scalpel, and it was with one of the same Kind, having a Button at the End, that the *French King* was happily cut, and cured; whence it has been denominated *Bistouri Royal*. But, as I observed, neither this Scalpel of ours, nor that used upon the *French King*, can be advantageously used in deep Fistulæ. We are therefore obliged to the celebrated Surgeon M. BASSIUS of *Hall*, for the Publication of a new Scalpel for this Purpose; (See *Tab. XXXV. Fig. 8.*) in a Treatise *de Ani Fistula*, *Hale* An. 1718. which Scalpel he describes armed with a long and flexible Point of Silver. The Beak of this Instrument, marked C, is to be passed in the Fistula, and brought out at the Anus, in the same Manner as directed before in the preceding Section. For this Operation of cutting Fistulæ in the Anus, may be also commodiously used the *Syringotomus* in Part described by GARENGEOT, and represented here in *Tab. XXXV. Fig. 3.* the Management of which is also like the preceeding: but it may be better held and guided by the Handle E E; and, as the long Beak CD is inconvenient, I have contrived another protracted only to F, which I find to perform its Office more conveniently. But in all these various Methods of Treatment, when the Incision is made, we must dress first with dry Lint, Compresses, and the T Bandage. And in the subsequent Dressings the callous Lips must be gradually taken off by corrosive Applications, particularly red Precipitate; and the Wound afterwards healed with *Balsam. Copaivæ*, or the like.

Other Methods.

IX. There are some, who pass a flexible Silver-wire through the external Aperture of the Fistula, instead of the Probe-End of the forementioned Instruments; which Wire they bend and draw through the Rectum and Anus, as in *Tab. XXXV. Fig. 1.* DD, and then joining and drawing the two Ends of the Wire tight together, they divide the fleshy Parts which it intercepts, marked CC, BE, with a falciform Incision Knife. This Method, which was formerly started by ÆGINETA, is so much in Favour with GARENGEOT, that he thinks it more likely than any of the rest to prevent a Return of the Disorder: but by what means it can make any such Prevention, I am ignorant, notwithstanding its Recommendation from Antiquity. Others, again, use a flexible and grooved Probe or Director, *Tab. I. lit. M.* or *Tab. XXXV. Fig. 2.* which being passed into the Fistula, and inflected so as to come out of the Anus, they then divide the intercepted Parts, by cutting into its Groove with a Scalpel or Scissars; which Method is cried up by the Moderns, as preferable to all others in deep Fistulæ: but in what it excels them, I know not. But in whatever Method the Patient is to be cut, the Surgeon should do it with great Care and Circumspection, to avoid wounding any of the larger Blood-vessels in the Rectum, which, in deep Fistulæ, might occasion a fatal Hæmorrhage^a. After the Parts are incised, they should be cleansed from their Blood, and the State of the Wound examined, to observe if there are Sinuses, and callous or corrupt Parts, which lie as yet concealed; that such Parts may be afterwards laid open, and further

^a As SAVIARD remarks in *Obs.* 49. and PALFYN *Operat. Chirurg.* Cap. 20.

incised

incised by the Scalpel and Finger, or Probe and Scissars. But if the Weakness or Timorousness of the Patient forbid the Surgeon to lay the whole open in this Manner at the first cutting, as is frequently the Case, yet he should not neglect to do it afterwards; taking Care to cut off the most callous Parts, if possible, and to scarify the rest, by cutting either with the Scalpel or Scissars, as may be most convenient. By this means a more speedy and copious Suppuration will be induced; and the indurated, or corrupt Parts, will be the sooner removed by escharotic and detergent Medicines. And, to speak the Truth, the Mundification and Agglutination of the Wound can never more happily or speedily succeed, than when all the callous and corrupt Parts have been exactly removed by the Knife or Scissars.

X. I had another Method of performing this Operation with different Instruments communicated to me by RUNGIVS of *Bremen*, while I resided there to attend some Patients for the Stone. He uses three Instruments, which are nowhere else described. The first is a grooved Probe or Director made of Steel or Silver, a lateral View of which you have *Tab. XXXV. Fig. 9.* CD is the Handle, which is bent outward at E, so as to form an obtuse Angle. The Groove of the same Instrument is represented directly to the Sight in *Fig. 10.* His second Instrument is a Silver or Steel Cannula, about the Thickness of one's Finger, with a crooked Handle, as in the preceding; but in an opposite Direction, as represented in *Fig. 11. A B.* The Cavity of this is shewn more directly to the View in *Fig. 12.* His third and last Instrument, a Scalpel with a long and narrow Blade, *Fig. 13.* For the Use of these Instruments let us suppose a Fistula in the left Side of the Anus, as at *Fig. 1. C C.* The Cannula (*Fig. 11. A B.*) being first dipped in warm Water, and then lubricated with Oil, is next passed into the Rectum, and its Handle D given to be held firm by a prudent Assistant. Then the Operator takes the grooved Probe (*Fig. 9.*) warmed and lubricated like the former, and passing it through the external Aperture of the Fistula, and obliquely through its interior Orifice into the Rectum, conducts its Point so as to enter the Cannula, pressing it hard against the same: That it has entered the Cannula, he perceives partly by the Ear, and partly by feeling with the Finger *in Ano.* He then holds the Probe or Director in his left Hand; while, with his right, he takes the Scalpel, *Fig. 13,* and passes it along the Groove of the Director to the Cannula; by which means he divides the Fistula in a Direction outward from the Intestine, conducting the remainder of the Treatment and Dressing, as before. This Method seems to be preferable to the rest for deep Fistulæ, because the End of a *Syringotomus*, or even of a Probe, cannot in such be easily inflected, and brought out again through the Anus, without the Hazard of lacerating and injuring the Parts. But even this requires the utmost Precaution, to prevent the Knife from slipping beside the Cannula, so as to avoid wounding the Rectum, and adjacent Parts; for which Reason the Cannula, *Fig. 11.* is made thus large. When the Fistula is on the right Side, the Instruments must be applied in a contrary Direction. I am sensible that a Method was proposed by MASSIER before RUNGIVS, for cutting Fistulæ of this Part by passing a straight Cannula into the Anus, and cutting either with a direct or crooked Scalpel; which I also remember to be a Practice recommended by RAW in his *Chirurgical Demonstrations.* But this Method of RUNGIVS

RUNGIVS's
Method de-
scribed.

appears the most convenient, and the best adapted to avoid the Injuries which may attend the others.

Treatment
of external
and superfi-
cial Fistulæ.

XI. If a Fistula or Abscess be recent and superficial, terminating in the Skin and fat Membrane, without penetrating the Sphincter *Ani* or Rectum, it should then be first enlarged or dilated, (if narrow, as is generally the Case) by inserting Tents made of prepared Sponge, or of Gentian, and other Roots, which gradually swell, and extend the Parts by their imbibed Moisture. When a sufficient Opening is this way obtained, the Parts are to be first cleansed with Escharotics and Detergents, and then consolidated, or healed, according to the Directions which we have before given for Fistulæ in general (in Part I. Book V. Chap. on *Fistulous Ulcers*.) But, in many Cases, it is most adviseable to dilate immediately with the Knife or Scissars, dividing the incumbent Skin and Fat by a simple Incision; which must also be the Method when Tents do not prove sufficient to make a proper Opening, for the Removal of what is become callosous. For the first Dressing, it may be sufficient to dilate the Fistula with dry Lint; and, at every succeeding Dressing, if more Sinuses appear, they must be laid open, and deterged as before. The callous, indurated, and foul Parts may be gradually removed at every Dressing, partly by the Knife and Scissars, and partly by the Use of Escharotics, (particularly *Merc. præcip. rubr.*) applied where the first cannot conveniently reach. When the vitiated Parts are thus removed, you may dress with some digestive Ointment, as *Ung. Apostolor. cum. ol. ovor.* and when the Sanies, or thin Ichor, discharged from the Fistulæ, changes its disagreeable Smell, Colour, and Consistence for that of a thick uniform Matter, its Cavity filling up with new and sound Flesh; there then remains nothing more to do than to heal and cicatrize with some vulnerary Balsam, and the daily Application of *Sp. Vini, Aqu. Calc.* and, at the end, of dry Lint only. Sometimes a small Tubercle appears instead of an external Opening in these Fistulæ, and, upon a strict Survey of the Tubercle, it appears perforated with a small Pin-hole leading to the Sinus of the Fistulæ: and in this Case too, the small Track is to be laid open, and followed to the Extremity, removing the Callosity, deterging and healing as before.

Treatment
of the deep-
er Fistulæ.

XII. But if the Fistula has so far penetrated as to enter the Rectum, Anus, or its Sphincter, or so as to make the Side of the Intestine very thin; the Case will then hardly ever admit of a Cure without the Operation of perforating and cutting the Intestine, together with the Sphincter, as we before observed. Therefore to cut a Patient for a Fistula of this Nature, the Surgeon, having fixed him in a proper Posture, first introduces his Fore-finger into the Anus, and then passes a Probe, or the Probe end of a *Syringotomus*, (*Tab. XXXV. Fig. 5.*) down to the Bottom of a Fistula towards the Rectum, making a Perforation into it against the End of his Finger; but in such a Manner as to avoid injuring any other Part of the Rectum, Bladder, &c. He then reflects the End of the Instrument which perforated the Intestine, and brings it down through the Anus, thereby dividing the Parts, as we before directed at Sect. VII. VIII. and IX. preceding. And thus an incompleat Fistula is converted into a perfect or compleat one. When a Fistula near the Anus tends towards either Side of the Perinæum, rather than to the Intestine itself, it is then adviseable to lay it open by Incision, deterging and healing as before. Lastly, in dividing deep Fistulæ of

of these Parts, it may be proper to pass a Cannula like that at *Fig. 11. Tab. XXXV.* and then to incise with the Scalpel *Fig. 13*, but cautiously, to avoid injuring any other Parts.

XIII. The third Class of Fistulæ in the Anus, are those termed occult or blind, opening only into the Intestine internally. These can never be cured without making an Opening by an external Incision to come at the occult Sinuses. The most convenient Part for making this Incision may be known either from its appearing with some Tumor, Hardness, Pain, or Redness and Inflammation; and especially if, at the same Time, the Finger perceives a Sinus, or soft Matter, like an Abscess under the same Part. When the Part to be incised is detected by the forementioned Signs, the Apertion thereof may be performed with a Scalpel or Abscess Lancet, the Patient being secured in the Posture before described for cutting a Fistula; and for the greater Safety, to avoid injuring the Rectum, or adjacent Parts, the Index may be passed in the Anus, in order to press the Tumor outward during its Incision. By this means you are to convert an imperfect into a compleat Fistula, to render the Cure thereof more practicable and certain: and, after the Apertion made, it may be further enlarged according to the Necessity of the Case, with an Incision-knife, either upon the Finger, or in a Director; carefully removing all the callous and vitiated Lint, Compress, and Bandage, and compleating the rest of the Cure according to our Directions before given for compleat Fistulæ. See *LE DRAN, Obs. 82.*

Treatment
of blind
Fistulæ.

XIV. But if none of the forementioned Signs appear, to direct the Surgeon to the affected Part to be incised; in that Case the Finger may be passed into the Rectum, either with or without the *Speculum Ani*, (*Tab. XXXIV. Fig. 15.*) in order to examine the State of the Fistula internally: which is to be done by passing up a large and flexible Silver Probe bent. (as in *Tab. XXXV. Fig. 14.*) by the Side of the Finger in *Ano*, that the crooked Part of it may be by the same Finger directed and insinuated into the Fistula, *Fig. 1. G.* In performing which the *Speculum Ani* may frequently be serviceable. The Probe thus entered, is then to be discreetly thrust forward in the Fistula, till its Head makes a Point or Protuberance externally near the Anus *F*, sufficiently obvious both to the Sight and Touch. Then the Surgeon is to cut down upon the Head of the same Probe with a Scalpel, till the Knife and that Instrument meet each other: after which the Head of the inflected Probe or Silver-wire is to be drawn a little way out through the external Wound, and further bent or brought together with its other End, so as to intercept the Parts to be divided, as represented by *DD.* To save Trouble, the Surgeon may in short pass the Probe-end of a *Syringotomus* in this Manner, instead of the Silver-wire, so as both to intercept and cut the Parts at the same Time.

Another
Method of
proceeding.

XV. But whatever be the Method taken to lay open and cleanse Sinuses of the Fistula, the Remainder of the Treatment ought to be conducted in the following Manner. First, the external Wound is to be well dilated and cleansed, by filling it with dry Lint and Rags; which, in Case of a profuse Hæmorrhage, ought to be previously dipt in some styptic Powder or Liquor. And in deep Fistulæ, the Dossils of Lint and Rags thus inserted, should be bound with a Thread hanging out, to extract them by; lest if one should be left behind, it might perpetually

What is to
be done af-
ter the O-

perpetually keep open the Fistula and frustrate the Cure. These Dressings are to be retained with several, at least three, thick Compresses, each larger than the other, the smallest to be applied first, as we directed for a *Prolapsus Ani*: and the Compresses again are to be sustained by the T Bandage, made either of Linen-cloth, Callico, or Fustian, neatly and firmly applied. Then the Patient may be put to Bed, and, in Case of Fulness, when little Blood has been lost in the Operation, a Vein may be opened, to prevent a supervening Inflammation. The first Dressings should not be removed before the second or third Day after the Operation, without the Patient has a Call to go to stool; and even then the Dressing ought not to be hastily undone, without great Urgency, since the Patient in this Disorder has frequently a Tenesmus, or Inclination without any real Call. But in great Urgency, the Bandage must by all Means be loosed, both to cool the Patient and keep the Dressings clean. If some Parts of the Fæces are, at any Time, forced into the Fistula in their Discharge, Care should be taken to wash them out with a Sponge and warm Wine, or together with dry Lint; with which last the external Orifice of the Fistula should be all along dilated and kept open, that it may not close, before the Bottom and other Parts are deterged and incarnated. When any callous, or foul Parts appear in the succeeding Dressings, they should be immediately treated with the Application of dry Lint, spread with some digestive Ointment mixed with red Precipitate; which should be repeated till they are removed, and the Flesh looks sound and red, especially towards the Bottom of the Fistula, which ought always to be first and principally cleared. But, above all, a strict Regard should be had for the first Fortnight, not to leave the least Recess or Sinus behind, which might frustrate the Cure, or occasion the Disorder to break out again. The Discovery of Sinuses thus neglected, may be made partly by the Probe, and partly by the Quantity, with the Colour and Odour of the discharged Matter; which, when small in Quantity, and of a laudable even Consistence, is a Sign of Incarnation, which may be then promoted by the Application of mild Balsams and dry Lint. The Patient's Diet should, in the mean Time, be spare and temperate during the whole Cure, as well as for some Time after: nor ought he in Strictness to be permitted the Use of any thing but Milk, Broth, Jellies, &c. that yield little or no Fæces, which would greatly retard the Cure, by repeated fouling of the Parts, and straining on the stool, and also occasion more than necessary Trouble, in often removing and renewing the Dressings.

Treatment
of compli-
cated Fistu-
læ.

XVI. Fistulæ of the Anus complicated with an Ulceration of the Bladder or Urethra, are of all the most dangerous, and difficult to Cure, usually proving inflexible to all Means. When a Fistula or Ulcer is also attended with a Caries of the *Os ischium*, or *Os coccygis*; in that Case a free Opening or Communication must be made betwixt the Part affected and the Ulcer, that proper Remedies may be applied to remove the Caries; such as *Essent. Aristolochiæ rotund.* which I have found excellent, with proper Mercurials, and a Decoction of the Woods given internally to depurate the Blood from scorbutic or venereal Infection. When the Bone is once cleansed by this Means, and its Surface covered with new Flesh, the Remainder may be performed as in simple Ulcers. Those Fistulæ, which are accompanied with an Ulcer of the Bladder, or Urethra, hardly ever admit of a Cure; except the Patient be of a good, healthy, and strong Habit, and the Disorder recent and superficial: and then the Use of
proper

proper Internals, with external Detergents and Balsamics, may sometimes have their desired Effects.

XVII. I suppose my Readers are no less acquainted than myself, that there have been several other Methods proposed by the Ancients^a, for treating Fistulæ of the Anus, viz. by the Use of Ligatures, with the Application of actual and potential Cauteries; which I here designedly omit, as being less successful, and much more troublesome, both to the Patient and Surgeon, than the other Methods of Treatment here delivered. But I must not forget to mention, that those who have had their *Sphincter Ani* greatly corroded, or even only weakened by one of these Fistulæ, are very often troubled for the future with a perpetual Tenesmus, or Incontinency of their Fæces; when, on the contrary, the same Sphincter-muscle may be divided or cut through several Times, and healed again, without leaving any such Symptom, when the Patient is robust, and suffers no Loss of Substance in the Part. Sometimes the Operation of cutting is rendered impracticable in this Disorder, either through the great Age and Weakness of the Patient, or the great Depth and Inaccessibility of the Fistula itself: in which Cases we must attempt to palliate the Disorder, by mitigating its Pain and other Symptoms, with Injections, and the Application of mild Balsams. But notwithstanding the miserable Condition of many Patients thus afflicted, we are told by DIONIS^b, the *French* were so fond and proud of being in the Fashion, when their King *Lewis XIV.* had a Fistula, that they boasted of the Disorder as a Point of Honour, and would even undergo the Operation, when there was no real Necessity.

Observations on Fistulæ.

XVIII. As the Treatment of this Disorder makes a very difficult and important Branch of Surgery, we shall close the present Chapter with adding a few Cautions for the better Management of the same. 1. In cutting deep and callous Fistulæ, the external Incision should be much larger than the Internal, that there may be a free Access to cleanse and dress to the Bottom of its Sinus. And it may, in many Cases, be adviseable to make two Incisions in a cross Manner, and then to extirpate the callous Parts at the Bottom and Sides of the Fistula by the Scalpel, or Scissars, the vitiated Part being held up by a Hook or Pair of Pliers: for if the Fistula be not thus cleared, especially at its Fundus, the Cure thereof will not succeed, or at least it will be likely to break out again. 2. In order to avoid injuring the Rectum or Bladder in cutting, it will be best to turn the Edge of the Knife from the Intestine, and to cut outwards towards the *Os Ischium*. 3. When the external Opening of the Fistula is not near the Anus, but towards the Middle of the Nates, its Sinus proceeding under the Skin towards the Rectum, the Sinus should then be laid open by a Director and Incision-knife, or a pair of Probe Scissars; dressing the first Time with dry Lint, and leaving the further Examination of its Nature and Progress to the next Dressing. 4. When the Sinus appears to have perforated the Rectum, as in a compleat Fistula, the Operation of cutting should then be performed by passing the Probe-end of the *Syringotomus*, not through the Aperture, but to perforate the Intestine therewith, near a Quarter of an Inch above it: by which means,

Rules and Caution.

^a HIPPOCRATES Lib. de *Fistulis*; CELSUS Lib. VII. Cap. iv. § 4. ÆGINETA. ALBUCA SIS. Part III. Cap. 80. where he mentions no other Remedy but the actual Caution.

^b In his Chapter on the *Fistula*.

its callous Parts may be more easily removed, or cut off; which they should be for about a Straw's Breadth all round, after the Rectum and its Sphincter are incised. 5. If a profuse Hæmorrhage should follow from the Division of a large Blood-vessel, it should be taken up, if possible, with a crooked Needle and Thread. Or, when that is impracticable, you may press down a Pledget, dipped in some Styptic, upon the Vessel with your Finger for a considerable Time, near half an Hour or longer, till an Eschar or Crust occlude the Orifice; observing in your Dressing to fill the Cavity well with Lint and Dossils, retained by thick Compresses, and a pretty tight Bandage. Besides which it may in some Cases be proper to order an Assistant to compress the Parts for several Hours with his Hand, the Patient being without the least Motion; without which Precaution the divided Vessels have sometimes bled so profusely into the Cavity of the Intestines, without any escaping by the Anus, as even to kill the Patient^a. 6. When the Patient has not made water for several Hours after the Dressing, he should be reminded thereof, lest, by retaining his Urine too long, he might have a Suppression, or a fresh Hæmorrhage from the violent Straining. 7. If a fistulous Patient has also the venereal Disease, the Cure of the last should be accomplished before the other be undertaken, which will then frequently heal without cutting. 8. The particular Bandage for this Disorder, contrived by M. ARNEAU, and recommended by GARENGEOT, we shall describe at large in the third Part of our System following, upon Bandages. 9. And, lastly, when the Wound, made by the Operation, begins to heal up, GARENGEOT advises a Tent of Scraped Lint, like a Finger, to be spread with *Ung. Pompholig.* and to be thrust into the Anus or Intestine, to forward the Cicatrization: but dry Lint alone will generally answer the same Intention with equal Advantage, and less Trouble. Useful Observations on this Disorder may be read in LE DRAN, *Obs.* 82, 83, and 86.

C H A P. CLXIX.

Concerning Abscesses of the Anus.

Design of
this Chap-
ter.

I. **T**HOUGH we have slightly touched upon these Abscesses in the preceding Chapter; yet, as they generally prove the antecedent Causes of Fistulæ, and as a Knowledge of their Nature and Treatment will reflect some Light for the preventing and curing those Disorders, we shall here give them a separate Consideration.

Nature and
Kinds of the
Disorder.

II. The Formation of an Abscess in this Part is sometimes very sudden, and proves critical; at other Times it increases very slowly, and almost insensibly, resembling at first no more than a little Boil, which proves at length extremely painful and troublesome to the Patient by its malignant Symptoms. The first Appearance of the Disorder is often by a hard conical Protuberance, about the Size of a Filbert, beset with a red Circle or Inflammation of the adjacent Integuments, the external Skin frequently resembling an Erysipelas. When the

^a See PALFYN *Operat. Chirurg.* Cap. xx.

Parts are thus inflamed without any hard Tubercle, an Abscess will be sometimes formed in the Space of four and twenty Hours. The Pain and Inflammation is sometimes so great as to occasion a Fever, with Thirst, Reachings, Restlessness, &c. As for the other kind of Abscess, which advances slowly, without any great Inflammation; though its Suppuration be also equally slow, yet it generally gives Pain enough to alarm the Patient long before it comes to a Head.

III. But whatever be the Manner of its first Formation, the Matter of the Abscess, when suppurated, always makes itself a way, by eroding the adjacent *Membrana adiposa*, till it has either perforated the Intestine inwardly, or the Skin externally: And, in its Progress, it usually makes various Sinuses in the cellular Membrane, converting its included Adeps into a rancid and acrimonious Matter or Sanies: and that sooner or later, according to the Acrimony of the collected Matter; which eroding through the Intestine, external Skin, or both, we need not wonder that Fistula should thence arise, some indeed slight and superficial, but others of worse Consequence.

Progress of
the Abscess.

IV. At the first Appearance of the Disorder, it may be treated with discutient Fomentations and Cataplasms, with Bleeding, in order to disperse the Tumor before it suppurates. But when it is advanced too far, the only Benefit that can then be had, must be expected from the Knife, or an Apertion of the Tumor by Incision; in order to which its Suppuration should be promoted as in other Abscesses. When the Tumor has lost its Hardness and Pain, appearing soft, and yielding to the Touch, in order to open it, the Patient is to be placed in the same Posture, as for the Operation of the Fistula *in Ano*, at Sect. VI. of the preceding Chapter. After this the Finger is to be introduced into the Rectum, to know whether the Matter tends inwardly, when it does not point outwardly. But before the Surgeon makes his Incision, proper Care is to be always taken to bring the Matter of the Abscess to a due Degree of Maturation.

Examina-
tion of the
Abscess.

V. The Maturation of these Abscesses may be greatly promoted by the repeated Application of a warm Bread and Milk Poulrice, with a little Saffron, and a Plaster of *Diach. cum gumm.* but such Applications should never be spread farther than the Part affected, nor be continued beyond their due Time; as that may spread the Disorder, and make it penetrate to more important Parts. The Surgeon ought not therefore to wait till the Matter of the Abscess points externally; but after the Cataplasm has been used a few Hours, having cleansed the Skin, he should search out the thinnest Part of the Integuments, by pressing with his Fingers of one Hand in the Anus, and with his others externally, that by the pointing of the Matter, he may be directed where to make his Incision. For, to wait any considerable Time, under a Notion of the Matter's coming to a Suppuration, as some imprudently advise, would be to spread the Disorder, and infect the adjacent sound Parts.

Maturation
of the Ab-
scess.

VI. The thinnest and most prominent Part of the Abscess being marked, and pressed outward by the Finger *in Ano*, is then to be perforated in the Middle, either with an Incision-knife, or Abscess-lancet, till the Matter flows out at the Apertion, which is to be further enlarged at Discretion, by elevating the Knife or Lancet in their Extraction; a proper Vessel being also placed under the

Apertion of
the Abscess.

Wound to receive the Blood and Matter, which are to be gently forced out by compressing the circumjacent Parts with the Hands.

Enlarge-
ment of the
Incision.

VII. The Matter being thus, either wholly or in Part, discharged, the Apertion may then be more conveniently enlarged, by making a longitudinal Incision in the protuberant Lips: and, after examining the Nature and Progress of the Sinus with the Finger, another Incision may be made, traversing the former in Form of a Cross, or in any other Direction that may appear more convenient; always making the external Opening sufficiently large, for the Convenience of Dressing down to the Bottom, and for the Removal of the vitiated Parts.

Dressing.

VIII. For the Dressing of the Abscess, GARENCEOT advises to fill the Sinus with three or four Tents or Dossils of Linen, each having a Thread annexed, of a different Colour, hanging out of the Wound; that by this means no Mistake may be made, by drawing out the lowermost Dossil before the others, which might occasion an Hæmorrhage, or other bad Symptoms. These Dossils or Tents, he says, are to be again covered with several other Bundles of Linen; and those, again, with several narrow Compresses, each a little larger than the other, as they approach nearer the Bandage. But, I must confess, I can see no Reason for thus loading the Part, in the Dressing of a common or simple Abscess. For my own Part, I fill the Sinus with Dossils of Lint, and compleat the Dressing with Compress and Bandage, as in other Abscesses. Nor do I force away the Lint in the subsequent Dressings, but treating the Sinus with some digestive Ointment, and a *Diachylon* Plaster, I wait for the spontaneous Separation thereof by a Suppuration of the Surface; by which means I certainly avoid any profuse Hæmorrhage. And, lastly, I deterge the Abscess like as in Fistulæ of the Anus, and then heal with some vulnerary Balsam.

Treatment
in Case of
an Hæmor-
rhage.

IX. If any considerable Blood-vessel be divided, if it cannot be secured by tying with a crooked Needle and Thread, a Compress dipt in some styptic Liquor should in that Case be applied and pressed on the Vessel with the Finger, till the Hæmorrhage ceases or abates: then the Part should be well filled with Dossils of Lint, retained with several thick Compresses, ordering an Attendant to press his Fingers upon the Part of the Dressing opposed to the divided Vessel, as we directed in Sect. XVIII. of the preceding Chapter. As for the Mundification, Incarnation, and Cicatrization, and compleating the Cure, the same Methods may be taken as for other Abscesses in general. But when the Abscess is formed in this Part from a venereal Cause, they generally become either fungous or callous, and seldom yield to a Cure without the Assistance of Mercury. See LE DRAN's *Obs.* 84 and 85.

M. GAREN-
CEOT's Dis-
tinction.

X. We shall conclude this Chapter with observing, that GARENCEOT distinguishes Abscesses, like Fistulæ of the Anus, into compleat and incompleat. Notwithstanding this Division, when he comes to treat of their Cure, he has not a Word upon the latter kind, though in reality they deserved a more particular Consideration than the other, as may be inferred from what has been said on this Distinction of Fistulæ in the preceding Chapter, whither I refer the Reader for what more might be here said on that Subject.



*An EXPLANATION of the THIRTY-FIFTH PLATE.
Relating to Fistulæ of the Anus.*

Fig. 1. Represents the *Fistulæ* in the Anus. AA denote Part of the *Intestinum rectum*: B the *Sphincter Ani*: CC a perfect or complete *Fistula* of the Anus, terminating with one Aperture externally, and the other in the Intestine: DD a flexible Probe or Silver-wire, passed through the two Orifices of the *Fistula*, and bent so as to come thro' the Anus E; the two Sides of the Wire intercepting the fleshy Parts to be divided, are drawn gently outward, for the more safe and convenient Performance of the Incision. F represents an imperfect or incomplete *Fistula*, having only the Orifice G opening into the Intestine: HH denote the two Extremities or Heads of the Silver-wire.

Fig. 2. Represents an Instrument like a large Needle, from GARENGEOT, made of flexible Silver, having an Eye marked A for the Transmission of a Ligature, when any one would by that means divide the Parts, according to the Advice of the Ancients; and it may also serve to convey a Slip of Linen through a Wound or Ulcer in the Manner of a Seton. B the Point of the Instrument, which is to perforate the Intestine in an incomplete *Fistula*, and then to be inflected and brought out through the Anus; it has a Groove running through its whole Length, by which it may serve to guide the Knife instead of a Director.

Fig. 3. Is a kind of *Syringotomus* taken in part from GARENGEOT's Treatise on Instruments (Tom. I. pag. 337.) AAA denotes the Concave and sharp-edged Part for cutting; BBB its convex Back, which is obtuse; CD the Silver-wire or Probe-end, which is flexible, and beginning at the letter C, terminates at the point D. The Part marked EE being bent in Form of a Hook, serves as a Handle to facilitate the cutting of a *Fistula*, when it is very hard or callous. F denotes where the Instrument terminated, as made according to my own Directions, without the Part DF, by which means it more commodiously performs its Office, than if it were of the whole Length here represented.

Fig. 4, 5, 6, and 7. Represent several common *Syringotomi* of the Ancients, of different Sizes and Curvatures, and furnished either with obtuse or sharp Points, according to the different Circumstances of *Fistulæ*: in these the Part which cuts is marked AB; C the Probe-end; DD the Convex and obtuse Back.

Fig. 8. Is a Scalpel or *Syringotomus* first published by BASSIUS. AAA denote the Edge of this Falciform Scalpel; BB the flexible Probe-end, made of Silver; C its Point; DD its Handle.

Fig. 9, 10, 11, 12, and 13. Represent the Instruments recommended to me for these *Fistulæ*, by RUNCIUS, a Surgeon of Bremen. *Fig. 9.* AB its grooved Probe or Director; CD the Handle; E the Part where the Director is usually bent according to the Nature of the *Fistulæ*. *Fig. 10.* gives a direct View

of the Groove in the Director, as the preceding gave an oblique one. *Fig. 11.* AB is a Tube, or large Cannula, to be passed into the Anus for the Reception of the Edge of the Knife, *Fig. 13.* in cutting the Fistula, that it may not injure the other adjacent Parts: CB its Handle inclined to the opposite Side. *Fig. 12.* gives a direct View of the Cavity in this Cannula, that its Diameter may be the better discerned. *Fig. 13.* is a long and narrow Scalpel, which, in cutting for a Fistula, is conducted through the Groove of the Director *Fig. 9.* into the Cavity of the Cannula *Fig. 11.*

Fig. 14. Exhibits a flexible Silver-probe or Wire, bent in such Manner that the Part A being introduced through the Orifices of the Fistula, and brought to its other End, form a Space for intercepting and extending the Parts of the Fistula to be incised.

PART II. SECT. VI.

Concerning Disorders incident to the upper and lower Extremities, particularly to the Hands and Feet.

THOUGH we have considered most of the Disorders which usually happen in these Parts, as Wounds, Fractures, &c. in the former Part of our Surgery; yet we must not here omit to treat of a few which are more peculiar to these Parts, and which we have not examined; such as the Paronychia, Ganglion, Suture of a Tendon, &c.

CHAP. CLXX.

Of the Paronychia, or Whitloe.

Nature of
the Disorder.

I. **A** Paronychia or Whitloe is an inflammatory and exceeding painful Disorder, which infests all the Joints and particularly the Ends of the Fingers, which are generally much swelled, with a beating or throbbing, and intense Heat. There is sometimes little or no Tumor observed, when the Disorder lies deep at, or in the Bone: and sometimes again the Tumor, Pain, and Inflammation are extended from the Finger up to the Elbow, or even to the Shoulder; from the Communication of the Fingers with those Parts by their Flexor Muscles. Sometimes the Pain is slight and inconsiderable; but very often 'tis so excessive and tormenting, as to make the Patient lament Day and Night without a Wink of Sleep: and, in some Constitutions, it even excites a raging Fever, with Faintings, Convulsions, Delirium, an Abscess, or Sphacelus of the Part, and, without timely Assistance, Death itself.

II. As

II. As the Symptoms of this Disorder vary in their Appearance and Malignity, according to the different Parts thereby affected, it has been therefore distinguished by Surgeons into various Kinds. Kinds. GARENGEOT reckons four, and GOUVEUS five: but, for my own Part, I cannot find any Ground for distinguishing more than three Species of the Paronychia. The first Kind is when only the Integuments are affected at the End of the Finger, either in its Back or Fore Part, or near the Nail; in which Case the Symptoms are usually not very malignant, though the Pain be extremely acute. The second Kind of Paronychia is, when the Periosteum is inflamed or eroded, in which Case the Symptoms are more or less violent than in the preceding, in Proportion as that very sensible Membrane is more or less violently affected. The third and worst Kind of this Disorder is that infesting the nervous Involucra, or Coverings of the Tendons belonging to the Flexor Muscles of the Fingers, or even the adjacent Nerves, or Tendons themselves: for, in that Case, the Disorder often appears with the most excruciating Pains, and the black Train of its most malignant Symptoms.

III. The true and proximate Cause of a Paronychia ought, in my Opinion, to be referred to an Inflammation of the adjacent Integuments, chiefly of the Periosteum, from an Inspissation of the Blood, or an Obstruction of its small Vessels; which is also argued from the intense Heat and Pulsation of the affected Part. This Inflammation may again proceed from internal or external Causes, acting separately or combined: as, internally, an Inspissation, or Acrimony of the Blood and Lymph, induced by a tense Fibre, and a heating Regimen, or an Abuse of the Nonnaturals; externally, a Contusion, Wound, or Puncture, or with the Stimulus of a foreign Body, as a Needle, Thorn, Splinter, &c. continuing to exaggerate the Part. Therefore a Paronychia is more dangerous and severe, in Proportion to the Intensity of the Inflammation, and Sensibility of the affected Parts. We are not ignorant, that some Physicians have attributed the Cause of this Disorder to Worms, which appeared to the Eye upon making an Incision in the Part: but this is not often the Case, notwithstanding the *Germans* frequently call this Disorder by the Name of *Worms in the Fingers*. Causes.

IV. In the Beginning of the first Species of Whitloes, there appears a small Tumor and Hardness in the affected Part of the Finger, but without any great Pain; which at length increases, and the Part begins to look red and inflamed. But though the Disorder thus gradually advances in this Species, and the Tumor is much increased; yet the Pain is generally pretty tolerable, and not extended beyond the Finger, as it is in the other Kinds of Whitloes. And here the corrupt Matter is generally apparent. But the nearer the Inflammation approaches the Periosteum and Tendons of the Fingers, the more intense is the Pain, which is sometimes spread through the whole Arm. Signs of the first Kind.

V. The second Species of Paronychia is distinguishable from the former, in that the Pain is very intense, though confined to the Extent of the whole Finger, or barely its End; being sometimes so severe as to excite a Fever, Restlessness, Convulsions, Delirium, &c. without the Appearance of any great Tumor or Inflammation; nor does the Pain here extend itself up to the Elbow, as it does in the third Species of this Disorder. Signs of the second Kind.

VI. The:

Signs of the
third Species.

VI. The third Species of the Disorder may be discerned by there being little or no Tumor at the End of the Finger, especially when the Capsula of the Tendon is inflamed more in its internal than external Part. Here the Pain is so intense, that the Patient knows not what to do with himself: and, instead of the Disorder being confined to the Finger, it spreads through the whole Hand and Arm; and particularly that Part of the Carpus which is invested with a transverse and annular Ligament, continued even to the Internal Condyle of the *Os humeri*, from whence the flexor Muscles of the Fingers arise, though the Pain is even sometimes extended to the Shoulder, with Fever, Convulsions, &c. If any corrupt Matter be lodged in the Capsula of the Tendon, it does not form any Appearance of Tumor at any Part of the Fingers, their Joints being in other Parts too dense and compact. The Hand is usually swelled more than the Finger, though with less Pain: and the Arm is sometimes enlarged to such a Degree by it, that GARENGEOT has observed it as big as one's Thigh.

Event of the
Disorder.

VII. The Paronychia terminates variously according to its different Nature and Symptoms. That of the first Kind is not very dangerous. But when the Parts affected are near about, or at the Root of the Nail, the latter generally separates from the Finger, and with a good deal of Pain to the Patient; though sometimes only that half of the Nail separates, which is nearest to the Whitloe. When the Matter is lodged either under the Nail, or immediately next to the Tendon of the Finger, it then usually gives the Patient intolerable Pain and Uneasiness. Those afflicted with the second Species of this Disorder are in a worse Condition than the former, as the Pain and other Symptoms are here more violent, so as sometimes to put the Patient in Danger of his Life; tho' it very seldom arrives to that Degree of Violence, as far as I have been capable of observing. Sometimes I have found a Caries take place in the Bones of the Finger, as a Consequence of the preceding Inflammation and Suppuration; and when this is the Case in the last Bone of any of the Fingers, which is a very small one, it scarce ever exfoliates, but the corrupted Part generally destroys the whole. As for the third Species of the Paronychia, in that the Patient's Case is the worst of all, being really dangerous. For here the intense Pains, Abscess, Gangrene, Tumor, and Inflammation of the whole Arm, together with a Fever, and other malignant Symptoms, frequently destroy the Patient; unless prevented by a good Constitution, and a timely Assistance from Art. If in this Disorder an Abscess should be formed under the annular Ligament of the Carpus, near or upon the *Pronator quadratus* Muscle of the Radius, GARENGEOT^a then thinks it the Surgeon's Business to declare the Case incurable without Incision. And even then the Patient may be in Danger of losing the Use of his disordered Finger, notwithstanding the most prudent Treatment; and then the inevitable Consequences of the Disorder, or Patient's Neglect and ill Habit of Body are often, by the malevolent, unjustly attributed to a want of Care or Judgment in the Operator.

Treatment
by Medi-
cines.

VIII. For the Cure of a Paronychia GARENGEOT proposes Incision before any Tryal has been made with other Remedies. But my Opinion is agreeable to the Advice of HIPPOCRATES (§ VII. *Aph.* 6.) that the more gentle Means

^a AS GARENGEOT observes in his Chapter on the *Paronychia*; but with us the Case is seldom bad.
and

and Medicines are to be first used, before we have Recourse to the more severe and dreaded Help of the Knife: and the more so, as Experience demonstrates, that many of these Disorders (being slight or recent, and under good Circumstances) are frequently dispersed and removed, by the use of diluent, discutient, and cooling Remedies, without an Incision in the diseased Parts, of which the Patient must be greatly afraid. The most approved Method for removing the Inflammation and Obstruction in this Manner, is to let the Patient hold his Finger for several Hours in *Sp. Vini* highly rectified, or camphorated with *Theriaca*. For the same Intention may be used, with Success, a Decoction *ex allio & fol. Scord. Sabin. Manipulo in Lacte parat.* in which hot Liquor the Finger should be either immersed for several Hours together, or else frequently fomented with it by Linen-rags. The *Parisian* Academists (*Acta Ann.* 1707. p. 57.) recommend for this Purpose, frequently to dip and hold the disordered Finger a little while in scalding Water. Some applaud the Use of an *Affa fœtida* Plaster, applied warm: others recommend, as from Experience, the Application of the white Skin of a boiled Egg-shell. To which we may add, that *RIVERIUS* directs a frequent Intrusion of the diseased Finger into a Cat's Ear, with Bleeding, and the Use of cooling Medicines. If the Patient finds Relief by any of those Means, he should persist in the Use of them till the Finger is well, and without Pain. But when there is already a Suppuration actually formed, either before or under the Use of these Means, then indeed an Incision is the only Remedy. When the Patient is afraid to admit the lancing of his Finger, or when there is no Appearance of Matter formed, to direct the Incision, in the first Kind of the Disorder; a Suppuration may be then promoted by the Application of a Diachylon-plaster with the Gums. But in the second or third Species of the Paronychia, where the Periosteum or Bone are affected; this Practice would be highly pernicious, as it must greatly increase the Pain and Disorder, and induce an Abscess, Caries, a Gangrene of the whole Arm, and probably the Death of the Patient.

IX. In order to succeed in the Cure of a Paronychia, its particular Species is to be first accurately distinguished. If it be of the first Kind, and but superficial in its Extent, its Cure may then be easily effected. As soon as the Surgeon perceives the Matter to point or form a little Protuberance, he ought immediately to hold and press it betwixt the Finger and Thumb of his left Hand, while he makes a longitudinal Incision therein with his right; by which means the Matter being discharged, the Finger will then heal almost of itself. *HILDANUS* (*Cent. I. Obs.* 97.) proposes the following, as a very safe and ready Method of curing this Disorder, which he has made Trial of with Success. First, he fomented the Finger for some Time in a Decoction *ex Flor. Chamam. Melilot. sem. fenugrec. & cydonior.* in Milk. Then gently cutting off the Surface of the Skin where the Pain lay, he found some red Specks. These, being incised, afforded a Drop or two of a red Water; which, when he had wiped off, and dressed the Wound with Lint moistened in an Infusion of *Theriaca* in *Sp. Vini*, the Pain quite vanished, and the next Day the Finger was well without any other Remedy.

X. When the Disorder happens either underneath, at the Bottom, or on either Side of the Nail, the Patient then generally loses the whole, or some Part of the Nail.

Operation
for the first
Species.

Treatment
of a Parony-
chia near
of the Nail.

of it. If a purulent Matter lies concealed under the Nail, it usually excites violent Pain and Inflammation, by eroding the adjacent Parts. It ought therefore, according to the Advice of SOLINGEN, and other expert Surgeons, to be discharged with all possible Expedition, either by cutting off the Nail, or by making an Incision into it; and, after pressing out the Matter, the Wound may be dressed and healed with Lint dipped in *Sp. Vini*, or *Aq. Calcis*.

When the
Matter runs
deep.

XI. When the Matter spreads further or deeper under the Skin, the Intention is still the same, to discharge it by Incision without Delay, lest it affect the subjacent Bone before it erodes a Passage through the Integuments, which are in this Part more hard and impenetrable to it than in others. If the Patient be unwilling to have the Part incised, the Necessity thereof should be laid open to him, by declaring the Consequences, in order to bring him to a Compliance, and to clear the Operator from the Charge of Neglect or Misconduct: and in the mean Time, the Finger may be dressed with a Plaster of Diachylon with the Gums, to promote the Suppuration. If the Skin should break with the simple Application of the Plaster, as is sometimes the Case, the Opening may be in some Measure enlarged; and when the Matter is discharged, and the Parts cleansed, let the Dressing be with some digestive Ointment, or *Linimentum Arcei*, made warm, and mixed with a little Spirit of Wine, with a Piece of the forementioned Plaster and a Bandage. But if the Patient submits to the Operation, his Finger is to be placed on a Table, with the affected Part upwards, in which Posture it is to be held firm, together with the whole Arm by a robust Assistant, lest the Patient should flinch in the Operation, to the Detriment both of himself and the Surgeon. The Incision is then made with a strong and sharp-pointed Scalpel through the Integuments down to the Bone, even to the End of the Finger; by which Means the stagnant Blood and Matter being set at Liberty, the Bone is in no Danger of being thereby infected.

Treatment
of the se-
cond Kind.

XII. In the second Species of the Paronychia, when the Matter is contained between the Periosteum and Bone, an Incision is then also to be made for its Discharge, according to the preceding Directions; only here more Care is to be taken, that the Knife penetrate to the Bone. If the Pain abates soon after the Operation, 'tis a good Sign of a speedy Cure, notwithstanding there might be little or no Quantity of Matter discharged; which is so small as to be hardly perceptible in many Cases. With regard to making the Wound or Incision, it is to be observed, that many Surgeons lay it down for a Rule, never to incise the fore or back Part of the Finger, but on one Side of it, to avoid injuring the Tendons, which bend and extend the Internodes. But this appears to be a Caution unnecessary; partly because those Tendons are not continued to the very Ends of the last Internodes, and partly because we find by Experience, that the Finger may be safely incised in this Manner. The lateral Method of Incision is however preferred, and ordered to be strictly observed by GARENGEOT, but without the Addition of any Reason for it. He likewise adds, that if the Pain does not abate soon after the Incision has been made on one Side, 'tis a Sign that the other Side is affected; and therefore another Incision is to be there made. But my Advice is always to make your Incision on one Side, when the Pain and Tumor is discernible in that Part, or when the Disorder happens in
the

the second or third Internode of the Finger towards the Hand : but on the other Hand the Incision may be better made in the Middle of the Finger's Ends, when the Matter points there, or when the Disorder infests the whole Joint. Nor is the Infliction of two Incisions, where one well made may be sufficient, either consistent with the Inclination of the Patient, or Reputation of the Surgeon.

XIII. The Incision being made, the Blood should be suffered either to flow out a little while of itself, or else it should be pressed out, to abate the Inflammation, and discharge what may be offensive. In the next Place, the Wound is to be dressed with dry Lint and Diachylon Plaster, with a Compress dipped in warm Spirit of Wine, each of them being cut in Form of a *Malta* Cross, and retained by the Bandage proper for Disorders of the Fingers. In dressing the Wound again the next Day, there generally appears a little spongy or proud Flesh sprouting out, which often Alarms an unskilful Surgeon without any Reason; for this is no bad Sign, and may be easily removed, either with the Scissors, or some Escharotic mixed with digestive Ointment. The Wound is next to be treated like those in which the Bones are affected, *viz.* with *Essent. Myrrh. Succin. Balf. Peruv. &c.* And if the Bone is foul, the Wound should be kept open with Lint dipped in *Tinct. Myrrhæ*, till there is an Exfoliation made of the morbid from the sound Parts, or else till the whole Bone comes away entire, as is often the Case; after which the Wound may be deterged and healed without Difficulty, which would be impracticable so long as the Bone remains foul.

Treatment
after the O-
peration.

XIV. We shall now proceed to the Treatment of the third and last Species of the Paronychia, in which the Pain and Inflammation, or the malignant Matter is seated in the membranous Capsulæ, or Coverings, which invest the Tendons of the Flexor Muscles of the Fingers. This is a Case that has not often occurred to my own Observation, and was first proposed by GARENGEOT, whose Advice is to treat it in the following Manner. First, the small Tumor (which is discernible at the End of the Finger, partly by the pointing of concealed Matter in the Capsula, and partly by the Pain felt by the Patient) is to be opened, by making an Incision longitudinally down in the Capsula of the Tendon, which will discharge a Kind of Lymph or Serum to the great Ease of the Patient: but notwithstanding the Pain will return again in a little Time. Sometimes the Matter makes its own Way without any Incision through the Skin and Capsula of the Tendon; and about its external Opening appears a very sensible Caruncle, or fleshy Substance, which is constantly moistened with the discharged Humour. In this last Case he advises to pass a Director through the external Opening into the eroded Capsula of the Tendon; and then to make an Incision through the Parts incumbent on the Director, by which Means a thicker Matter will be found concealed in the divided Sinus. If the internal Sinus of the Paronychia is in the middle Part, or second Joint of the Finger, and is laid open so far by Incision, in that Case PETIT advises to continue the Incision, even down for above a quarter of an Inch into the Hand, in order to free the Tendon from the Stricture received from the Tension of the Parts at the End of the Finger, where the Capsula is hard and cartilaginous: for in the Hand, where it is soft and membranous, it will yield to the confined Humours without pressing the Tendon.

Treatment
of the third
Kind.

Treatment
of a Paro-
nychia,
which pene-
trates into
the Hand.

XV. When the Disorder or Matter has reached the membranous Part of this Capsula of the Tendons, which expands itself from under the annular and transverse Ligaments of the Carpus up to the Cubitus, and when the said Matter begins to convert the Adeps upon the *Pronator quadratus* Muscle of the Radius into Pus or Sanies; in that Case the Director is to be gradually insinuated, and the Parts incised upon it down to the annular Ligament. Which done, the Patient's Hand is to be bent to relax the Parts, and then the Director conveyed under the said Ligament, making an Incision or Aperture, by cutting down into the Groove of the Director on the other side of the Ligament, which itself should be left entire. The Aperture thus made, and sufficiently enlarged, the Matter will be more easily discharged, and you may have a better View of the Sinus or Abscess; in order to which you ought also to make a gentle and gradual Separation of the Tendons as much as possible from each other at the Carpus. In the next Place M. GARENGEOT informs us, that it is the good Advice of M. THIBAUT, who was lately a celebrated Surgeon at *Paris*, to pass a Ligature by a Probe through the two Apertures as in a Seton; by which means the Matter may be cleanly discharged, and the Ulcer deterged without dividing the Ligament. But if the Fever, Pain, and other Symptoms, do not abate by this Procedure, M. PETIT advises immediately to divide or cut off that Tendon, which is most disordered, close to its muscular Flesh above the annular Ligament; by which Method he asserts, the Pain has instantly abated, and the Patient been happily cured. He also thinks that the transverse Ligament of the Carpus should be served in the same Manner, when that is inflamed, or eroded by purulent Matter, so as to excite most acute Pains: the Success of which Practice is confirmed by the Instances of M. ARNAUD, formerly an eminent Surgeon of *Paris*. When the Director cannot be well passed under the annular Ligament for this Purpose, an Incision should be made betwixt the Artery on the Radius, and the Tendons of the Profundus and Sublimis Muscles^a; by which Incision, being sufficiently enlarged, the confined Matter is to be prudently evacuated, and the State of the Sinus examined. To recommend this Practice to us, GARENGEOT relates the Case of a Patient of ARNAUD's, who had this Disorder in such a deplorable Manner, that some Surgeons judged the Arm ought to be amputated, and others, that the Patient could not long survive it: but, upon Mr. ARNAUD's dividing the transverse Ligament, all the Symptoms disappeared in a surprising Manner, and the Patient was quickly cured. But it is here a very necessary Caution to observe, that the Patient's Hand be neither extended during the Operation, nor for some Time after. For when the Hand and Carpus are in an inflexed Position, the divided Ligament will more readily unite, and the Hand recover its usual Motion: but if they be imprudently extended, the Tendons under the divided Ligament will start out of their Places, and perhaps not only hinder its uniting, but also impede or deform the proper Motions of that Member for the future.

The Dress-
ing.

XVI. Having finished your Operation in this Manner, your next Business is to proceed to the Dressings: which are to be made when any of the Capsulæ of

^a I once opened a large Abscess in this Part near the radial Artery; but it had no Communication with the Fingers, nor the Capsulæ of their Tendons.

the Tendons are opened, first, with several Dossils of dry Lint, of an oblong Form, and laid on each Side the Tendon, to suppress the Hæmorrhage by compressing the divided Vessels. But if any very large Blood-vessel be divided, and bleeds profusely, it should be taken up with a crooked Needle and Thread: for it is not safe here to apply caustic and styptic Remedies for this End, as in other Wounds. In the next Place, the Hand and Arm are to be wrapped up to the Elbow in a warm, emollient Cataplasim, retained by the Bandage of eighteen Heads, *Tab. 9. Fig. 4. B B.* The advantage of which Bandage over the long ones, may appear from your being thereby enabled to apply, and renew the Dressings at Pleasure, without moving or disturbing the Parts. Lastly, to render the Dressing as complete as possible, you ought to apply the entire Part of the Bandage to the sound Part of the Limb opposite to the Wound; by which means the Dressings will be more firmly and effectually retained upon the affected Parts.

C H A P. CLXXI.

Of Ganglions or Knots of the Tendons.

I. **A** Ganglion is, by our modern Surgeons, understood to be a hard Tubercle, generally moveable, in the external or internal Part of the Carpus, upon the Tendons or Ligaments in that Part, but usually without any Pain or great Uneasiness to the Patient. The *Germans* term the Disorder *Oberbein*, i. e. *Hyperostosis*; either because this Kind of Tumor is seated on a Bone, or from its resembling that Body in Hardness. Though Ganglions so nearly resemble Tumors incysted (considered in Chap. XXVIII. preceding) that *CELSUS*, *Lib. 7. Cap. 6.* makes them one and the same; yet their Difference may appear, if it were only from their different Seats. For Ganglions are confined to the Tendons and Ligaments of the Hands and Feet; but incysted Tumors are not restrained to any Part of the Body. However, it is to be observed that some, even of the Moderns, call a similar Species of hard and moveable Tubercles in the Head, and especially the Forehead, by the Name of Ganglions; as you may see in a professed Dissertation *de Ganglio*, published at *Altorf*, *Anno 1717*.

Description.

II. With regard to the Causes of Ganglions, they seem generally to proceed from an inspissation of the viscid Juices which are let out, and lodged betwixt the Fibres and Membranes, when the Tendons and Ligaments of these Parts have been injured by a Fall, Blow, Strain, Contusion, Luxation, or the like: in which Case they gradually increase more or less, as long as the Fibres yield, the Juices find Vent, so as to advance to the size of a Filbert, Nutmeg, Walnut, or even a Pidgeon's Egg. *BLANCARD* mentions that *RUYSCH* found a Ganglion in a dead Subject like a pellucid and crystalline Humour; similar to which, I saw my Son cut out one, the Size of a Nutmeg, from the Back of the Wrist of a young Woman at *Helmstadt*, in the Year 1736. To which we may add, that the noted *CYPRIANUS*^a has taught us, that they proceed from a Kind of

Causes.

^a *Lib. de Factu è Tuba Fallopiana exciso*, pag. 76.

Lymph, like the White of an Egg, which is retained and inspissated in the Capsulæ of the Tendons, without coming to Suppuration; which is also conformable to what I have frequently observed myself.

Kinds.

III. If we attend to the Differences or Kind of Ganglions, we shall find a very great Variation, as well in their Size, which we before mentioned, as in their Number, Figure and other Circumstances. Sometimes there is but one, sometimes several, and in each Hand; as we have a notable Instance in the *Miscellanea Acad. nat. curios. Dec. I. Ann. 3. Obs. 326.* Some are oblong, round, or oval, with an equal or unequal Surface. Some of them, which are recent, may be easily dispersed; while others, which have been of long-standing, hardly yield to any Remedies but the Knife.

Cure.

IV. The inspissated Matter of a recent Ganglion may often be happily dispersed, barely by rubbing the Tumor well every Morning with the fasting Saliva, and binding a Plate of Lead upon it afterwards for several Weeks successively. Many attribute a stronger discutient Virtue to the Lead, when it has first had some Mercury rubbed upon it: and others, with less Reason, prefer a Bullet that has killed some wild Creature, especially a Stag. Some, with FORESTUS^a, advise the Use of *Emplast. de Ammoniaco vel de Ranis cum Mercurio*; and often to Rub them well with *Ol. Saponis, Philosophorum, vel Petrolium*. Sometimes indeed a recent Ganglion will speedily vanish by the Use of these Discutients, especially by adding a repeated Pressure on them with all one's Might by the Thumb^b. MEEKREN writes, that a Cure may be readily performed, if the Patient frequently lays his Hand on a Table, and strikes on the Tumor with his Fist; see *Tab. XXXVI. Fig. 1.* And this seems to be the Reason why MUYS asserts, that an inveterate Ganglion, which cannot be dispersed by Medicines, may yet be dissipated by frequent beating with a Stick, or a wooden Mallet armed with Lead; and then applying to the affected Part the *Emplast. de Ranis cum Mercurio*, to prevent a Return. We also read, that HELVETIUS made use of a wooden Hammer for this Purpose. And thus they Account for it: The Membrane or Sacculus of the Tubercle being burst by the Blow, the collected Matter is thereby discharged; which is afterward to be dispersed by frequent Rubbings and digestive Medicines. But, in this Operation, Care should be taken not to injure the Bones, Tendons, or other Parts of the Hands, when you strike the Tumor; for that might occasion the very same, or a worse Disorder. If none of these Means prove effectual, it will be necessary to remove the Tubercle, either by Incision or Caustics, as we have proposed for incysted Tumors, in Chap. XXVIII. They may be safely removed by Incision, provided you are careful to avoid the adjacent Tendons and Ligaments; as may appear from SOLINGEN, in *Part IV. Chap. 14. of his Surgery*: and I have myself several Times happily removed them this way. But as for rubbing them with the Hand of a dead Man, and the like superstitious Ceremonies, they are of so little Consequence, and founded on so weak a Basis, that, I presume, my Reader will readily excuse me from insisting on them.

^a *Obs. Chirurg. Lib. III. Cap. ix.*

^b See ÆTIUS *Tetrab. IV. Serm. III. Cap. ix.* and MUYSII *Prax. Chirurg. Dec. II. Obs. 8.*

C H A P. CLXXII.

The Suture of Tendons in the Hands.

I. **T**HE Suture of Tendons in the Hand is, by our modern Surgeons, performed, in order to join them when they have been cut asunder, that the Fingers, to which these Tendons belong, may not grow stiff, or lose their motion. This Operation of joining the divided Tendons by Suture, may be performed without much Difficulty, when they are seated superficially, or near the Skin. Such are the Tendons on the Back of the Hand, which serve to extend the Thumb and Fingers; as also those on the Backs of the Fingers themselves^a: to which we may add, the Tendons of the Flexors of the Fingers^b, which run on their Insides, with those of the Flexors and Extensors of the Hand near the Carpus. In the Leg we include the Tendons in the Ham^c, with the Tendon of the *Extensores Tibiæ* below the Knee, and the *Tendo Achillis*^d above the Heel, &c^e. Whereas the Tendons, in the Palm of the Hand are so deeply seated, that I cannot find one Instance of their being joined by Suture. It is observable, that this Practice has lain neglected by almost all the Ancients, in Conformity to the Saying of HIPPOCRATES (*Aph* 19. Sect. IV. and *Aph* 28. Sect. VII.) “that a Nerve or Tendon, being cut asunder can never grow or unite again afterwards,” which gave them an Aversion to this Operation, inasmuch as a slight Puncture in a Tendon often excites the most grievous Symptoms. Yet that there were some, in the Time of GALEN, who practised this Suture of the Tendons, may be concluded from his advising against it^f: which Advice was rigidly adhered to by the Generality, and particularly AMB. PAREY^g. However, this Operation has been sufficiently considered, and approved of by the Arabian Physician AVICENNA^h, GUIDO DE CAULIACOⁱ, SALICETUS^k, ROGERIUS^l, LANFRANCUS^m, BRUNUSⁿ, CHALMETEUS^o, ANDREAS A CRUCE^p, and others, among the ancient Surgeons.

Design of
Sutures of
the Tendons.

^a See a French Treatise, entitled, *L'Art de faire rapport en Chirurgie*, pag. 194, and 195. See also VERDUCON *Chirurgical Operations*, Chap. xxxii.

^b See MEEKREN *Obs.* Cap. 65.

^c PAREY, in his *Surgery*, (Book 9. Chap. 36.) relates, that these, and other Tendons of the Limbs, have been sewed together by some Surgeons; but that he never durst undertake it, for fear of exciting Pains, Convulsions, and other bad Symptoms.

^d VESLINGIUS tells us, (in *Obs. & Epist.* XV.) that he saw these two Tendons joined by Suture.

^e We have an Account of the Tendons belonging to the Flexors of the Carpus being happily joined by Suture, in WEPFER *Lib. de Cicuta Aquat.* p. m. 92 and 93. And a Suture of the Tendons belonging to the *Supinator longus* and *sublimis* Muscles in STALPART VANDER WIEL, Cent. II. *Obs.* 45.

^f *Lib. III. de Comp. Medicament.*

^g *Lib. IX. Cap. xxxvi.*

^h *Lib. IV. Fen. 4. Tract. 4. Cap. ii.*

ⁱ *Tract. 3. Cap. iv.*

^k *Lib. II. Cap. ix.*

^l *Lib. III. Cap. xiii.*

^m *Lib. II. Cap. ix. Doct. 3. Cap. iii, and in Chirurg. parv. Cap. iv.*

ⁿ *Lib. I. Cap. v.*

^o *Enchirid Chirurg. Lib. II. Cap. xi.*

^p *Lib. de Vulner. Tr. 2. Lib. II. Cap. viii.*

And yet, notwithstanding this, the Practice has been either unknown, or else unreasonably rejected as dangerous by their Successors till at length VESLINGIUS^a and SEVERINUS^b revived it in the last Century, after whom it was brought into Practice by FELIX WURTZ^c, who was seconded by many other celebrated Surgeons; particularly MAYNART^d and BIENNAIS^e of *Paris*, with PURMANNUS^f and others^g. This Operation succeeds best when the Wound is recent, or lately inflicted; but may be also undertaken with Success on the second, third, or fourth Day after the Accident. Yet the Difficulty is much greater to make a Suture of the Tendon, when it has been so long neglected as to let the Wound heal up; but that it is then also practicable, may appear from Experience, and the Writings of many able Surgeons^h.

When the
Suture is to
be under-
taken.

II. Before the Operation be undertaken, it will first be proper to consider, whether it may be necessary or practicable in the Patient's Case. For Tendons are frequently divided in Parts so as to be inaccessible to the Needle, and sometimes the Suture cannot be performed on them without great Danger; and in some other Cases, it may be practicable, and not necessary, as when the Tendons may be brought and retained together by Compress and Bandage without Suture. But if a considerable Part of the Tendon is cut off, or destroyed, or its Parts recede much from each other, and lie concealed betwixt the adjacent Muscles, so that the two Ends cannot be brought together, it will then be in vain to attempt the Operation. Nor can the Suture of a Tendon succeed well, if its Ends are violently contused, as the consequent Inflammation, Suppuration, and other malignant Symptoms, will prevent their uniting and healing, and the Symptoms be rather exaggerated by a Suture. In such a Case, it is therefore more adviseable, as GARENGEOT observes, to wait till the Inflammation and other Symptoms are removed, and to promote a Separation of the unsound Parts before you venture to use the Needle. The same Author also observes, after SOLINGEN, that the Tendons of the Extensors in the Back of the Hand may generally be united without Suture, by bringing and retaining the divided Ends to each other, the Fingers being all the Time extended out a little backwards, with Bandage and Compress. By this Method I have several times joined divided Tendons without any Suture, and particularly I succeeded this Way in a Lad, who had all the Tendons of the Extensors of his Fingers divided on the Back of his Hand. Therefore the Surgeon need not give himself the Trouble, nor

^a *Observat. and Epist.* XV. where he tells us, that he saw this Operation performed, not only with Astonishment (thinking it a rash Undertaking) by the *Arabian* or *Turkish* Surgeons, but also upon a Servant of his Father's in *Germany*.

^b *De Efficaci. Medic.* Lib. II: Cap. cxxiii.

^c *De Vulnerib.* Cap. xiv.

^d See MEEKREN *Obs.* 65.

^e VERDUC, VAUGUION, and DIONIS, attribute the Revival of this Operation to BIENNAIS; but say nothing of MAYNART, who performed it at *Paris* in the Middle of the last Century.

^f This Author asserts, in his *Chirurgia Curiosa*, that he has above a dozen Times happily joined divided Tendons by Suture with a crooked Needle; and the same he also asserts in his *Chirurgia Castrensis*, pag. 100.

^g ETMULLER tells us, he saw this Operation performed at *Paris* in 1665, or 1666, without mentioning by whom; and various Instances and Observations in this Kind of Suture, and other Disorders of the Tendons, may be seen in STALPERT VANDER WIEL, *Obs.* 45. Cent. II.

^h This is asserted by VERDUC and LE CLERC, in their *Treatises of Chirurgical Operations*, Chapter on the Suture of a Tendon; but it is denied by DIONIS.

his Patient the Pain of making a Suture, when the Tendons of the Flexors, or Extensors of the Fingers or Toes, are divided; since they may be brought to unite, by retaining them together with Splints, Compress and Bandage. But when a Tendon is punctured, contused, or but half divided, and Convulsions, with other malignant Symptoms follow; if they cannot be removed by proper Remedies (such as *Ol. Terebinth. cum guttulis paucis Ol. distillat. succin. aut Lavend.*^a) it will be then necessary to make a total Division of them, and, when the Symptoms are vanished, to join them together again by Suture.

III. The Method of uniting divided Tendons by Suture is as follows. In The first Kind of Suture. the first Place the wounded Member is to be inflected or extended, that the two Extremities of the Tendon may meet each other: but if the upper End of the Tendon, attached to its Muscle, be contracted and drawn under the Skin, in such a Manner, that it cannot be drawn down, or entered by the Needle, in that Case an Incision is to be made to take hold of it with the Pliers, drawing it gently downwards. But GARENCEOR thinking this Treatment too rough, draws down the Tendon by passing a Needle and waxed Thread through it, though the same may be done gently with the Pliers without any ill Consequences. But, before we proceed any farther, it must be observed, that there are two Methods of making the Suture, either with one, or with two Needles. The first Method, with one, is by threading a small, straight, and common Needle, either flat, or round at the Point, (*Tab. XXXVI. Fig. 2. AA*) with Slender, but strong and double Thread or Silk *BB*, being waxed, armed with a large Knot marked *C*. This Needle and Thread are to be passed through a Bit of Leather *D*, up to the Knot *C*^b, that the said Knot may not easily slip through the Tendon; see *Fig. 4. A*, and *Fig. 7. DE*. The wounded Hand is in the next Place to be extended flat upon a Table, or fastened in that Posture to a Ferula, or a Piece of Pasteboard, that the divided Ends of the Tendons on the Back of the Hand, *Fig. 4.* may meet together: then the armed Needle is to be passed through the Middle of the upper End of the Tendon, a little more than the Tenth of an Inch from the Edge where it was divided; and applying a stitching Quill or Cannula, (*Tab. VIII. C.*) to the opposite Side of the Tendon, the Needle is to be entered from without towards the internal Part, as in *Tab. XXXVI. Fig. 4. A*, after which it is to be passed in like Manner through the lower End of the Ward. Then placing a small Compress of Linen, Silk, or soft Leather^c, either dry or spread with Cerate, under the Thread as in the knotted Suture, *Tab. II. Fig. 22.* the Thread is to be tied thereon with a single Knot, and then with another Slip-knot, as represented by the Letter *B*. Lastly, after the Wound has been cleansed, it is to be dressed with *Bals. Capiv.* or some other vulnerary Balsam, applied warm with Lint and Compresses; fastening under the whole a Ferula, or Piece of stiff Pasteboard, adapted to the Form of the Hand, *Fig. 5.* with Compresses, to elevate the Fingers, and concluding the Opera-

^a *Ol. Tereb. cum Aq. Hungar. miss.* is also excellent: DUVERNEY recommends *Bals. Capiv. cum. Ol. Ovor.*

^b Some use a thin Plate of Lead instead of Leather, as MEEKREN, &c.) others, as VERDUC, use a small Linen Compress.

^c MEEKREN observes, that a crooked Needle was used by MAYNART, and the Needle figured by DIONIS is crooked.

tion with a proper Bandage. It is to be observed, that a small crooked Needle may be also used for this Operation, like that represented at *Fig. 6.* having a flat Point. If the Needle passes difficultly through the Tendon, you may use the Instrument *Tab. VI. Fig. 3.* If the Wound has been inflicted several Days before, and the Ends of the Tendon are become indurated, it may then be proper to cut off just the indurated Surface with a Pair of Scissars, before they are joined together by Suture, that they may the more speedily and intimately coalesce or unite: or, if the Wound is in Part healed up, or the Tendon adheres, an Incision and Separation is to be cautiously made, to set the Tendon at Liberty before the Operation.

GAREN-
GEOT's Method.

IV. M. GARENGEOT thinks he has improved and corrected the preceding general Method of performing the Suture of a Tendon, which he proposes in the following Manner. He thinks the Tendon ought not to be laid bare, nor pinched with a Pair of Pliers: and that it is a much safer and milder Method to join it, together with the external Integuments by Suture, according to the Directions which we have before given for that Purpose on Wounds. But GARENGEOT is not the first Starter of this Observation; for CHALMET^a long before taught, that when a Nerve or Tendon was cut through transversely, it ought to be reunited^b if possible, together with the adjacent Flesh, by Suture, which is also the Advice of VERDUC and CHARRIERE. But, to effect the Operation with more Ease, M. GARENGEOT advises the Use of the stitching Quill, *Tab. VI. Fig. 3.* by the Assistance of which the Needle may be better conducted through the Lips of the Wound, than by the bare Fingers. A crooked Needle with a flat Edge, *Fig. 6.* is here preferred before the common crooked Needle, whose Point or Edge is annular, *Tab. I. STU*; because the first Sort of Needle does not divide so many Fibres of the Tendon, as the last. When the greatest Part of the double Thread has been passed through the Integuments and Tendons, a Compress of Silk spread with Cerate, and convoluted into a Cylinder, is to be applied in it, as in a Loop, for sustaining the Ligature on the Lips of the Wound, as at *Tab. XXXVI Fig. 4. C.* When the Thread has been passed in like Manner through the lower Part of the Tendon, the two Parts being drawn together, so as not to ride over each other, and a cylindric Compress placed betwixt the Thread, the whole is then to be secured with two Knots, the one a single, and the other a slip Knot. But it seems to me a little surprising, that GARENGEOT should advise with VAUGUION, VERDUC, CHARRIERE, and DIONIS, that the divided Parts should ride over each other, when that must apparently impede the Agglutination; and, upon which account, it has been justly rejected by the skilful Anatomist and Surgeon Mr. COWPER, who happily reunited the *Tendo Achillis* by Suture, without it^c. But if the divided Ends of the Tendon have, through Neglect, become callous, and adhere so to the neighbouring Parts, that they cannot be reunited to each other; in this Case some of the above-mentioned

^a *Enchirid. Chirurg. Lib. II. Cap. xi.* published at Paris in 1564. CHALMET prudently adds, *if possible*; for the Tendon is frequently so much drawn up, as to leave a Space of two Inches, as Mr. COWPER relates.

^b He very judiciously adds, *if possible*: for very often the Tendon is so contracted and drawn back, that it cannot be united by this Method of Suture; but there is an absolute Necessity of laying it bare.

^c *Phil. Trans. No. 252. LOWTHORP'S Abridgement, Vol. III. pag. 298.*

Surgeons advise, first to separate the Tendon from the adhering Parts, and, after cutting off the callous Ends, to apply the Suture in the Method just proposed. This Kind of Suture may be also conveniently made with two square Bits of Leather applied to each End of the Thread and Compress under the Knot, as in *Fig. 3. AB*, and *Fig. 7.* The Kind of Suture for Tendons described by DIONIS is, of all the Methods, the most simple, resembling the Suture we have proposed for common Wounds: *viz.* to pass a convenient Needle, furnished with a single waxed Thread through the Middle of the upper End of the divided Tendon from without inwards, and then to pass it through the other End from within outwards at one Stitch; after which, the Needle being removed, the Thread is to be drawn, so as to conjoin the two Ends of the Tendon, and then tied upon a round Compress. But the preceding Methods are generally preferred before this.

V. The Suture of a Tendon by two Needles was first described, as far as I can find, by NUCKE, who directs two Needles to be passed one through each End of the divided Tendon. He says, a Thread of strong and thick waxed Silk is to be passed through the Eyes of two slender and common Needles, both which are to be passed inward through the upper Part of the Tendon, *Fig. 4. E*, and outward through the lower End of the Tendon *F*. but the two Needles are passed through on each Side the Edge of each Part of the Tendon. Then, removing the Needles, a Knot is made with the Thread upon a Compress of Leather, as we directed before. He prefers this Method to the preceding, as he thinks the Ends of the Tendon are hereby held more firmly together, without being apt to lacerate. When the Suture is finished, he sprinkles on *Pulv. ex Tereb. cost.* and dresses the Wound with *Linimentum Arctei*, or common Digestive, and secures the Parts from being displaced by Compress, Splints, and Bandage. Though there are some, who prefer the Suture with one Needle for Tendons in the Hand, as being less troublesome to the Patient and Surgeon: yet I think this Method may be useful in the larger Tendons. When there are several Tendons divided, the Suture is to be made upon each of them separately.

The Suture
with two
Needles.

VI. For the Dressings after the Suture, the Parts are to be first treated with Lint dipt in *Ol. Tereb. vel. Bals. Capiv.* over which is to be applied a Compress dipped and expressed out of warm Spirits of Wine. In the mean Time the Palm of the Hand is to be expanded and supported upon a stiff Pasteboard, *Fig. 5.* with Compresses and Bandage: and, lastly, the whole Arm is to be fomented with warm Spirit of Wine, or *Oxycrate*, and wrapped up in linen Cloths dipped therein; and indeed some use *Ol. lumbricor.* not without Success. And thus the Parts are to be retained till the divided Tendon appears to be united, which may be known by the Looseness of the retaining Threads, which ought then to be cut, and cautiously extracted: and the Compress which sustained the Knot, is to be likewise carefully removed; the Hand being afterwards sustained on the Pasteboard till the Wound is healed, with vulnerary Balsams and scraped Lint, as in others. M. GARENGEOT describes ^a a particular Machine for retaining the Hand and Arm in a convenient Posture, with the Fingers extended, and a little reflected: but as this Intention may be very well answered by the Means before described, I shall not insist on the Instrument, though it may be well enough adapted to the Design of its Author. If any Stiffness or Rigidity impede the

Treatment
after the
Suture.

^a In his *French Treatise on Chirurgical Instruments*, Tom. II. pag. 290.

Motion of the Part afterwards, it will be highly useful to rub in *Unguent. Dialthææ, Ol. Hyperic. vel Lumbric. vel Amygdal. &c.* every Day till it be removed. Lastly, it is not a little surprising, that many^a, even of our modern, and otherwise expert *Italian Surgeons*, should, with the Ancients, reckon this Operation fabulous and impracticable, when there are Instances of its Success given us by Authors of the most undoubted Credit and Veracity. They who desire more, may consult a professed Dissertation on the Subject by KISNERUS; as also GOELICKIUS *Diff. de Tendinum Affectibus*.

C H A P. CLXXIII.

Of Disorders belonging to the lower Extremities.

WE have before delivered the Method of amputating, bleeding, and treating other Disorders in the Leg and Foot. It now remains for us to consider the Nature and Treatment of what other Disorders are yet peculiar to those Parts.

Of Sutures in the Tendons of the Leg, particularly the Tendo Achillis, and Extensores Tibiæ.

Tendo Achillis how wounded.

I. Some of the Tendons in the Leg are also no less liable to be wounded than those of the Hand, particularly the *Tendo Achillis*, and Tendon of the *Extensores Tibiæ*. By the *Tendo Achillis* we mean, that vast large Tendon extended from the Calf of the Leg down to the Heel, and so called from the *Grecian Hero ACHILLES*, who is said to have been killed by a Wound thereof. When this Tendon is divided, the Patient cannot move or extend his Foot, to thrust forward his Body, and, if it be not again united, he must continually halt, or go lame. I know GARENGEOT^b indeed writes, that a certain Surgeon of *Paris* made a Cure of a Patient, who had a Fracture of the *Os Calcis*, by removing the Fragment of the Bone, and dividing this Tendon, the Patient afterwards being well without making any Suture, or any Defect remaining in the Limb. But I know not what to make of his Account; for I can see no Reason why a Surgeon should divide this Tendon in a compound Fracture of the *Os Calcis*: and the Relation seems to leave us in Suspense, whether or no he approves of a Suture in this Tendon. I could indeed wish, that this Author, who is, in many other Cases, of less Consequence, minute enough, had condescended to have given us a more exact Account of this wonderful Cure; and that he would express himself a little more intelligibly. BORELLI^c also observes an Amputation of a mortified Part in the great Tendon (I suppose the *Achillis*) and that, after the Wound was healed, the Patient could walk without any Impediment, the

^a AS ARCEUS Lib. II. Cap. MARCHETTI, *Chirurg. Obs.* 63. GENGA, in *Comment. ad Aphor. HIPPOCRAT. PECCETUS* in *Chirurg. Lib. II. Cap. xlvii.*

^b *Operat. Chirurg. Edit. 2. Tom. 3. pag. 267.*

^c *Observat. Cent. II. Obs. 2.*

Tendon being renewed, or filled again with a similar Substance. The *Tendo Achillis* may be wounded in various Manners, and attended with various Symptoms. When it is punctured, perforated, or but partially divided, the Patient is then afflicted with most grievous Symptoms, excruciating Pains, Convulsions, Fever, Gangrene, and perhaps Death itself; for the Symptoms must be worse here than in Punctures of other Tendons, as this is much larger. From whence the Ancients seem to have taken their Notion, that Wounds of the *Tendo Achillis* must be mortal, or at least highly dangerous, as being the largest of any in the Body; especially as they read or heard, that ACHILLES died of a Wound in this Part. The Symptoms attending a total Division of a Tendon, are usually much milder than those of a punctured or half-divided Tendon: and therefore the Pain and Convulsions attending the last may be frequently removed in a short Space, by cutting it quite in sunder, when the Application of no Remedies will take effect. If therefore the *Tendo Achillis* should be imperfectly divided, and malignant Symptoms supervene, they will disappear upon cutting it quite through: but then it must be joined again afterwards by Suture, which will not excite any of these malignant Symptoms. But why the Puncturation of a Tendon by a Needle, in making the Suture, should not be followed with the like bad Symptoms, as other Punctures inflicted by Accident, I must, with the Generality, confess myself ignorant, though we are certain of the Fact from Experience. Those, therefore, who judged by Analogy, deemed this to be so dangerous and unsuccessful an Operation, that they durst not attempt it. Even PAREY^a himself, who was otherwise a bold Operator, declined this Suture on the same Account: and the expert Anatomist VESLINGIUS^b was astonished to see the *Tendo Achillis*, and that of the *Extensores Tibiæ* conjoined by Suture, which he esteemed a rash Undertaking, till he was convinced of the contrary by Experience. But that a wounded *Tendo Achillis* may be also conjoined, like many other Tendons, without making a Suture, may be concluded from Analogy, and the forecited Cases of GARENGEOT and BORELLI; provided the Foot be bound up in an extended Posture, so as to make the divided Ends of the Tendon meet each other.

II. If the Surgeon shall judge a Suture of the Tendon to be necessary, the Performance of it may be with little or no Variation from the Suture of the Tendons in the Hands, before described in Chap. CLXXII. preceding; except that the Needle (whether straight, *Fig. 8. A.* crooked or flat, *Fig. 6 and 9.*) and Thread are to be here proportionably larger and stronger than for the smaller Tendons. The Operation itself may be conducted in the same Manner as we have directed in the Chapter preceding. The first Account of this Operation performed on the *Tendo Achillis*, and *Extensores Tibiæ*, that I can meet with, is given by VESLINGIUS, the last of which he saw performed in *Africa*. But after him we have Accounts of the Operation being successfully performed, not only by Mr. COWPER of *London*, after the Manner of NUCKE, see *Tab. XXXVI. Fig. 10, CD*, with two Needles; but also by M. THIBAUT and COSTIUS of

Suture of
the Tendo
Achillis.

^a See Lib. IX. Cap. xxxvi.

^b Epist. & Observat. XV.

Paris, according to the Relation of M. GARENGEOT^a. As the Accounts we have of this Operation are so few and imperfect, it being, totally omitted in many of our modern Systems; I shall therefore here insist upon it the more largely, and describe the remarkable Case given us by Mr. COWPER, as being the fullest and most exact I can meet with. But as even in this there are several Defects and Obscurities, I shall endeavour to supply and illustrate them.

A Case of
Mr. Cow-
PER'S

III. Mr. COWPER'S Case is of a Man thirty Years old, who had a total Division of the left *Tendo Achillis*, about three Finger's Breadth above the *Os Calcis*, the superior Part of the Tendon being drawn up, at least two Inches from the Inferior, as in *Fig. 10. AB*. The necessary Apparatus being ready for the Operation, Mr. COWPER first divides the Integuments *a, b*, which invest each End of the Tendon *AB*, that he may have free Access to the latter, and join them again by Suture^b. This done, he then takes the first Needle *C*, (which, like the other marked *D*, is straight and^c Slender) armed with a Piece of waxed Silk, and passes them through the upper Part of the Tendon *A*, about half an Inch above where it was divided^d, guiding the Needle from without towards the inner Side of the Tendon^e. He then passes the other Needle and Thread *D* of the same Kind, and in the same Manner through the upper End of the Tendon, but a little lower than the first. After this he passes both the same Needles through the lower End of the Tendon *B*; and, the Foot being extended, the two Ends of the Tendon, were made to meet each other, by drawing the Threads, which were afterwards tied in such a Manner, as to retain the Ends close, whilst the Foot continued in this Posture. The four Ends of the Threads were next cut off^f, and the Wound dressed with Lint dipped in *Bals. Tereb.* retained with Compress and Bandage. And, lastly, to sustain the Patient's Foot in such an extended Posture as to keep the Ends of the Tendon together, he contrived a sort of Arch of stiff Pasteboard; which, being applied to the anterior Part of the Leg and Foot, held the latter extended and inflexible, preventing a Rupture of the Threads or Suture. He observes, that the Patient

^a In *Operat. Chirurg.* Edit. prim. Tom. II. pag. 221. But in describing the same in his second Edition he has omitted the Name of THIBAUT.

^b Some of the moderns, and particularly GARENGEOT, disapprove of this Incision, as being apt to induce many Inconveniences; but it is apparent from the present Case, that nothing dangerous is to be feared from it; and if the End of the Tendon is drawn up so high as we are here informed, the Suture cannot be well performed without such an Incision.

^c GARENGEOT prefers crooked and large Needles for this Suture; but it appears from this Case, that such as are straight and slender will do; though crooked ones may be more handy.

^d There is here no mention made of the *Acutenaculum*, which GARENGEOT thinks so Necessary for this Suture; and therefore it is probable Mr. COWPER did not use any; yet the Operation succeeded.

^e Mr. COWPER does not indeed relate this in Words. But it is apparent from the Figure; though even the Figure does not shew what Part of each End of the Tendon was perforated by the Needle *C*, *i. e.* neither where it entered, nor where it came out.

^f In what Manner Mr. COWPER tied these Ends of the Threads, whether *C* with *D*, or *C* with *C*, and *D* with *D*, we are not told, either in Words, or by the Figure; but it seems to me to have been *C* with *C*, and *D* with *D*: otherwise he could not have extracted them separately one after the other, as he presently relates. Mr. COWPER also differs from other Surgeons, in this Operation, chiefly in making his Knots, or tying the Ends of the Threads, without any Compress of Leather, Cork, Linen, &c. He also tells us when and how to extract the Threads after the Operation; which is a Circumstance neglected by others.

complained of a great Pain in passing the Needles through the upper End of the Tendon; but felt no Pain in passing them through the lower End. After taking fourteen Ounces of Blood from the Patient's Arm, he left him on his Bed, and ordered an Ounce of *Syr. de Mecon.* to compose him in the Evening. The next Morning the Patient told him, he had got some Sleep in the Night, and complained of nothing but that he was often awakened with Twitchings in the Calf of the wounded Leg. The third Day after the Operation he was dressed the same as at first, only with the Addition of a Fomentation, made of a Decoction of Wormwood, Sage, Rosemary, Bay-leaves, &c. On the fourth Day the Dressing on the Wound appeared very wet with Synovia, or Gleeing from the Tendon. On the sixth Day the Matter became thicker, and still thicker on the eighth, the Gleet gradually diminishing. About this Time the two Ends of the Tendon were not a little dilated, and a white Slough appeared on it towards the upper Part of the Wound; to which was applied *Tinct. Myrrhæ*, instead of *Bals. Tereb.* Some time after, the Slough cast off, and the two Ends of the Tendon appeared overspread with a fungous Flesh. He then dressed the Wound with drier Applications than before, using sometimes Lint only, and sometimes *Pulv. Terebinth. coct.* On the tenth Day one of the Threads in the Suture appeared loose, which he therefore divided and extracted; and, in two or three Days after, the other Thread appeared flaccid, which he therefore removed in like Manner, retaining the Foot all that Time well extended by the Paste-board Arch^a. He was often obliged to apply mild Escharotics, to diminish the Fungus on the Tendon: and, in less than thirty Days, he began to walk about; though as yet but lamely. However, this was much abated towards the End of the second Month, and he afterwards gradually recovered all the Motions of his Foot, and shewed little or no Lameness in walking. AMB. PAREY, on the other Hand, gives us an Account of this Tendon divided by a Sword, and healed with much Difficulty without a Suture: but after the whole was cicatrized, when the Patient was rising out of Bed, it broke open again. See Book 9. Chap. 36. of his *Surgery*.

IV. VESLINGIUS gives but a very imperfect Description of the Suture, which he saw made in the *Tendo Achillis* and *Extensores Tibiæ*; saying only, that “ I saw that Tendon, which is formed by the *Gastronemii* and *Solei Muscles*, united by some Sutures made by certain Surgeons, after it had been cut asunder a little above the *Os Calcis*, in a Writer belonging to my Father: and, in like Manner, I saw the Tendon of the *Extensores Tibiæ*, which had been divided transversely by a Scimeter under the *Patella* at the Knee, in an *Arabian*, drawn afterwards together, and united with Sutures by a Surgeon of Tunis.” From which Relation we learn, that several, or more than one Suture was used; but this is a very superficial Account: VESLINGIUS takes no Notice how they dressed and treated the Wound. We have another Method of making the Suture on a divided *Tendo Achillis*, described by my late Friend KISNERUS, formerly Physician at *Francfort on the Main*, which we have here inserted from his Treatise, *de Tendinum Læsionibus*, and represented in our *Tab.*

^a It is observable, that this Pasteboard is not mentioned by other Writers, though absolutely necessary, to extend the Foot in and after this Operation; nor do I find any Notice taken by others, concerning the Application of Escharotics to take down a Fungus of the Tendon.

XXXVI. *Fig. 7.* By which the whole Business is so clearly exhibited to any one that has read the foregoing Chapter, that, in my Opinion, it needs no other Explication. But we may observe, that the lower End of the Tendon DE, is here perforated with the Needle first, contrary to the Method proposed by the Generality of Writers, who direct to enter the Needle through the upper End of the divided Tendon before the lower; and then to make a Slip-knot with the Thread upon a Compress of Leather or Linen, on the lower End of the Tendon, which is here made the upper. And though it cannot be denied, but that the Operation may be well enough performed, in the Method here proposed by KISNERUS; yet I must think, agreeable to the Practice of Mr. COWPER, that it may be more commodiously performed, by beginning with the upper End of the Tendon first.

Suture of
the Tendo
Extensor
Tibiae.

V. For making the Suture upon the divided Tendon of the extensor Muscles of the *Tibia*, which is a Case barely mentioned by VESLINGIUS, I cannot meet with any particular Directions given by any Author whatever. But I conceive it may be performed much after the same Manner with the preceding; only as this Tendon is broader than the *Tendo Achillis*, it cannot well be conjoined in all its Parts, without making a double Puncturation thereof with the Needle and Thread, after the Manner of NUCKE, *Tab. XXXVI. Fig. 4. lit. E and F.* The Wound may be afterwards treated as in the Case of Mr. COWPER, *Sect. III.* or according to the Directions we have given for Sutures on the Tendons of the Hand. But, in the mean Time, the Ham must be exactly extended, so as not to have the least Motion, by means of Splints of Wood, or stiff Pasteboard and Bandage, as in a Fracture of the *Patella*, keeping the whole Limb at rest. Though I make no doubt, that, if the two Ends of the Tendon were thus retained together, and the Leg kept extended in this Posture, the Tendon would unite, and the Wound heal, without making any Suture; and the sooner, because the Tendon being connected to the *Patella*, will not fly back, or recede so much when divided as the *Tendo Achillis*: and therefore the Ends of the former may be more closely and commodiously approximated, and retained together by Bandage, than those of the latter, especially if the Foot be confined in a Straw-cage. See *Plate XXXVIII. Fig. 20.*

Of Sutures
on the Liga-
ments.

VI. By way of Appendix to this Chapter, I shall conclude with observing, that it is my Opinion divided Ligaments may be almost as easily conjoined by Suture, as Tendons; and since their Substance or Texture are pretty much alike, divided Ligaments may be sewed and treated in the same Manner as Tendons, and that not without Success, in the Opinion of myself and others^a. But in Sutures of the Ligaments it may be best to use two Needles, armed with one Thread, as in *Gastroraphia*. This Kind of Suture is also preferred by GARENCEOT^b for Tendons; so that each End of the divided Tendon, or Ligament, is to be perforated by passing the Needles from their internal Margin: and, after drawing the Ends of the Thread sufficiently tight, you should fasten them by Knots, conducting the rest of the Treatment as before in the Tendons.

^a As KISNERUS *Disert. de Tendinum Læsionibus*, *Sect. 30.* VALENTINI in *Chirurg.* pag. 821. QUAPENDENS, &c.

^b *Operat. Chirurg.* Tom. III. Edit. 2. pag. 278.

C H A P. CLXXIV.

Of Varices.

I. **T**HE Name *Varices* is by Surgeons given to those unequal or knotty and livid Protuberances of the Veins, which are formed in all Parts of the Body, but most frequently in the Legs, near the Ankles, and often highly near the Knees, or in the Thighs, Scrotum, Abdomen, and sometimes the Head, as CELSUS^a observes. Women with Child are the most liable to this Disorder, but it also frequently happens to plethoric Men, or those who are hypochondriacal, have an inspissated or viscid Blood, and an Obstruction, or a Scirrhus of their Liver. The larger these Protuberances of the Veins grow, the more painful and troublesome they prove, by the greater Distraction of Coats or Membranes of the Vessel, which are sometimes quite ruptured, and occasion a profuse Hæmorrhage, or an Ulcer, as I have several times experienced. Those which are small, giving the Patient no Pain or Uneasiness, are usually neglected by him, and do not require any Assistance from the Surgeon.

Varices described.

II. To prevent the Disorder from running to any great length, when it is once on foot, it may be proper to bleed the Patient, prescribe a proper Regimen and Diet, and to apply an expulsive Bandage close to the disordered Legs, (as at *Tab. III. Fig. 1. F.*) and as the Bandage slackens, to draw it tighter by Degrees, and not to leave it off till the Disorder is without Danger. We learn from CELSUS, that the Practice of the Ancients was either to cauterize, or extirpate them with the Knife: but our procedure at this time of Day is much milder. In large Varices, we endeavour to contract and strengthen the dilated Coats of the Veins, by the Application of the said expulsive Bandage with Fomentations of red Wine, and astringent Medicines, especially Vinegar and Alum, and by binding a thin Plate of Lead on the distended Vessel. DIONIS here recommends a sort of leather Stockings, which, being tightened at discretion by the Lace, are to be wore Day and Night. See them represented in *Tab. XXXVI. Fig. 11.* Though the same Stockings may be also conveniently made of strong brown Linen in the same Form, as I have seen. Dr. HARRIS thinks *Tinct. Myrrhæ* a very potent Remedy for Varices, if it be often applied with a Feather, and the Part covered with *Emplast. Diasulph. Rulandi*; which will still succeed better with Bandage, or the strait Stocking.

Method of Cure.

III. But when the Varices are enlarged to an enormous Size, so as to give the Patient great Uneasiness, and threaten a profuse Hæmorrhage, with other bad Symptoms; it will then be necessary to lay the worst of them open by a longitudinal Incision with the Scalpel, or a Lancet. Then taking away about eight or ten Ounces of the grumous and viscid Blood, more or less in proportion to the Patient's Strength and Habit, the Wound is to be dressed with *Bol. Armen. & Acet.* applied on scraped Lint, to be retained with a Plate of Lead,

Cure by the Knife.

^a Lib. VII. Cap. xxxi. & Lib. V. Cap. xxvi. circa initium, ubi ait: *Cum vena intumescit, in Varicem convertitur.*

Compress, and Bandage. And thus the Vein unites again, as in Bleeding, and forms a Cicatrix strong enough to resist any farther Dilatation, and capable of preventing the like Disorder, at least in that Part of the Vessel. The Ancients cured Varices either by Incision or Cauterization, as CÆLSUS observes, (*Lib. VII. Cap. xxxvi.*) In the first Method they divided the Skin upon the Tumor; and, elevating the distended Vein with a Hook, they freed it by a Scalpel from the adjacent Parts, and then cut it out, healing up the Wound with a Plaster. GOUVEAUX tells us, that the most safe and ready Method of curing Varices is, by passing a crooked Needle with a double waxed Thread under the lower Part, or small End of the distended Vein, and then to make a strong Ligature on the Vessel with the Thread: after which the Varix is to be laid open with a Lancet, the grumous Blood removed, and the Wound well dressed with some digestive Ointment, with which it is to be treated till it is near healed up. The Method of curing Varices by Cauterization, used by the Ancients, is thus described by CÆLSUS (*loc. cit.*) They first divided the Integuments, and, having denudated the Varix, or disordered Part of the Vein, they then applied to it a small and flat Cautery, or red-hot Iron, with which they avoided touching the Lips of the Wound, by drawing them sideways by Hooks: and, lastly, the Dressings were made with the Medicines usually applied for Burns. Dr. HARRIS thinks this Treatment of Varices, by Incision and Cauterization, to be rash and cruel: but they are sometimes so large and painful to the Patient, as not only to hazard his Life, by bursting in the Night, as I remember an Instance, but also to prove incurable by any other means than the Knife and Needle.

Prevention.

IV. In order to prevent the Return of Varices when they have been once cured, it is highly necessary for the Patient to avoid plentiful and gross Feeding; rather preferring Drinks or Suppings, with Tea, Coffee, and light vegetable or animal Food, using frequent Exercise, with Frictions of the Legs, and bleeding at convenient Intervals, especially Spring and Fall. The same Cautions are also necessary to be observed by those, who are but just beginning to be afflicted with this Disorder; if they are desirous of preventing greater Evils, and of avoiding the Severities of the Knife or Cautery. MUYS tells us, that he opened a Varix combined with an Ulcer once every Year, and discharged a Pound of Blood; by which the Eruption of the Ulcer was prevented. See his *Rational and Practical Surgery*, Decad I. Obs. 6.

C H A P. CLXXV.

The Method of cutting out the Nail of the Great-toe, when it turns into the Flesh.

Nature and Cure of the Disorder.

I. **T**HE Great-toe Nail sometimes turns too much in on one Side, so as to enter the Flesh, and cause violent Pain and Inflammation to such a Degree, that the Patient cannot walk. The most general Cause of this Disorder is the wearing of too strait or narrow-toed Shoes, which they will do well to avoid, who are desirous of being free from the Complaint. But, in order to
set

set the Nail at Liberty from the tender Flesh, into which it has fixed itself, the Patient's Foot is first to be held half an Hour in hot Water, to mollify the indurated Nail and Skin: and that the Water may penetrate the farther, it may be proper to scrape off the outer Surface every two or three Minutes with a Penknife, or a Piece of Glass. Then the inflected Nail is to be gently elevated with the Finger, or a Probe, and a Piece of soft dry Lint interposed betwixt it and the Flesh, and so bound up with a Compress dipt in warm Spirit of Wine: which Operation is to be repeated again the next Day, till the Pain and Inflammation disappear.

II. If the Method before prescribed prove insufficient to remove the Disorder, we must then have recourse to the Knife. In order to which, the Foot, being macerated in warm Water, as before, is then to be placed and held in a convenient Posture upon a Chair by the Hands of an Assistant, and the Operator must insinuate the strong Nail-scissars, *Tab. XXXVI. Fig. 12 and 13.* gradually under the injurious Part of the Nail, to cut it off, and then extract it, if it does not come away of itself with a Pair of Pliers. Though the Operation itself may give the Patient no small Pain for a short Time, yet he will quickly perceive the Advantage by a more lasting Ease. The Part is next to be dressed with scraped Lint, or Linen Compresses, dipped in *Oxycrate*, or warm Spirit of Wine, with *Aqu. Cal.* and, in urgent Cases, it may be fomented two or three Times in a Day, till the Pain and Inflammation are removed. In the mean Time the Patient must not walk upon his Foot, till there is no Danger of the Pain and Inflammation returning. If any luxurious Flesh grow up in the Cure, it may be taken down with *Alumen ustum*. And, to prevent the Disorder from returning again for the future, the wearing of easy Shoes, with washing the Feet, and paring the Nails once a Month, are, by Experience, as well as the Word of M. DIONIS, confirmed to be the strongest Preservatives. But it must be observed, that the Nail of the Great-toe ought to be scraped very thin, either with a sharp Knife, or a Piece of Glass, that it may not have Resistance enough to run into the Flesh again by the Pressure of the Shoe.

Cure by the Knife.

C H A P. CLXXVI.

Of treating Corns in the Feet.

I. IT is not unfrequent for People to be troubled with hard Tubercles, like flat Warts, in several Parts of their Feet, especially upon the Joints of their Toes; which are generally termed *Corns*, from their cornuous or horny Substance, and by the *Latins*, *Clavi*^a, from their Figure, penetrating down into the Flesh like a Nail, or Spike. This Disorder, as well as the preceding, is not unjustly attributed to the wearing of too strait, or narrow-toed Shoes, which never fail to produce these Tubercles, with their unwelcome Torments; especially if the Person is obliged to stand or walk much, and in the Summer Time.

Corns described, with their Causes.

^a See CELSUS Lib. V. Cap. 28. N. 14.

Cure.

II. Various are the Methods used for removing these Callosities of the Skin and Cuticle, some by the Knife, and others by the Application of emollient and caustic, or eroding Medicines. But, which ever way they are removed, it is certainly much the best, to let their hard Substance be first sufficiently mollified. And this may be obtained by frequently macerating them for a considerable Time in warm Water, and afterwards paring off their uppermost and hardest Surface with a Penknife, which will often make them quite easy for a Time. But if this does not suffice, you may apply a Plaster of green Wax, *Gum Ammoniac. de Sapon, Emplast. de Mucilag. &c.* or a Leaf of House-leek, to be renewed every Day. After these Applications have been continued for some Time, you may then venture to peel them away with your Finger-nails, or cut and scrape them with a Scalpel; but with great Caution, to avoid injuring any of the subjacent Tendons of the Extensor-muscle, which might occasion violent Pains, Inflammations, Convulsions, a Gangrene, and even Death. All which have also been frequently the Consequences of Caustics penetrating to these Parts, such as *Ol. Vitriol. Aqu. Fort. Arsenic, &c.* as HILDANUS observes, *Cent. VI. Obs. 100.* It must be confessed, that the Treatment of Corns by thus soaking and paring them, with the Application of Emollients, does not very often totally remove them, but that they will grow up again in a short Time. However, the Patient is sure to be safe in this Practice, which seldom fails, either totally to extirpate them in process of Time, or at least to make them easy and tolerable, provided he wears easy Shoes, and repeats the Operation once a Month, or as often as they give him any Uneasiness. But if the Patient will take the Pains to wash his Feet, and soak the Corns well every Evening in warm Water and Bran, then to scrape off the soft Surface, and apply a fresh Plaster, he will go near to be quite rid of them in Time, provided he does not renew them by wearing strait Shoes.

C H A P. CLXXVII.

Concerning the Treatment of Infants that are Bandy-legged, with their Feet turning inward or outward.

MANY Children have their Feet distorted, or turned on one Side, either from some Defect in the Birth, or from the Imprudence of the Nurse, endeavouring to make the Child stand and walk, before its Legs are strong enough to support the rest of its Body. In some the Legs themselves are crooked, and in others the Knees are distorted. Those who have their Feet distorted inward, at the Articulation of the *Tarsus* with the *Tibia*, are denominated *Vari*; as those who have them distorted outward, are termed *Valgi*. The Nature and Treatment of this Disorder differs according to the particular Parts affected. The best Method of preventing it, will be by keeping weak-limbed and ricketty Children from a too early and frequent Use of their Legs in standing or walking. On the contrary, let them always sit or lie down, and be carried either in the Arms, or some Vehicle, till the Bones are become strong and firm by Age. But if



if even then the Disorder is also advanced, and become formidable, it will be necessary, after the Use of Emollients, to apply a Kind of Boots or Instruments described and recommended by HILDANUS and PAREY: (See *Tab. XXXVI. Fig. 14 and 15.*) which being composed of strong Leather, with thin Plates of Iron or Wood, proportioned to the Size of the Limb, its Crookedness may be gradually removed as it grows up, by constantly wearing the Machine Day and Night. But as these Boots are often very uneasy and cumbersome, when badly contrived and made by the Artificer, Surgeons have therefore invented some Instruments more properly adapted to the Case, as in *Tab. XXXVI. Fig. 16.* where the Parts AA are made of Hide-leather, strong Paste-board, or thin Plates of Iron or Brass, joined together by the flexible Leather BB, that they may be fixed upon each Side of the Leg, as in *Fig. 17.* being tied on by the Ligatures CC, and constantly wore Day and Night. Thus by the frequent Use of Emollients, and these two Instruments of HILDANUS, *Fig. 16 and 17.* the Incurvation of the Foot and Ankle may, by Degrees, be remedied. But if the Deformity is not great, I think it better to leave the whole to Nature, than to molest the Parts with Machines, which injure them, and stint their Growth. For the Parts would improve naturally of themselves, as they grow up, better without their Assistance, as I have often observed, provided the Children do not stand or walk much, but are carried or wheeled about. For more on this Head, consult HILDANUS *Cent. VI. Obs. 89 and 90.* SOLINGEN *Tab. XII. LE CLERC, &c.*

An EXPLANATION of the THIRTY-SIXTH PLATE.

Fig. 1. Represents MEEKREN's Method of removing *Ganglia*, by beating with the Fist on the Tumor A.

Fig. 2. AA Shews a small straight Needle with a flat Point, for the Suture of Tendons in the Hand. BB a strong but slender waxed Thread with a large Knot C at the End, intercepted by a square Bit of Leather D, through which the Needle and Thread are passed up to the Knot.

Fig. 3. Exhibits two square Bits of Leather perforated in the Middle for making the Suture of the *Tendo Achillis*, as they are represented in *Fig. 7. E. F.*

Fig. 4. Gives the Method of making the Suture for a Division of the Tendons belonging to the Extensors of the Figures on the Back of the Hand: *aaaa* the transverse Divisions of the Tendons; A the Manner in which the double Knot of the Thread is fixed on a Square Bit of Leather upon the upper end of the divided Tendon. B shews the Manner in which the double Thread is tied with a slip Knot over a round Compress, without a Bit of Leather, in the lower end of the Tendon. C shews the Knot of the double Thread intercepted upon the end of the Tendon by a round Compress instead of a Square piece of Leather, the other ends of the Thread D, being fastened with a Slip-knot on a like Compress as before. E denotes the Method of Suture used by NUCKE, in which the upper end of the Tendon is perforated in two distinct Places *bb*, with two small Needles and one Thread, the loop-end of the Thread being intercepted by a Bit of Leather, or round Compress E: after which the other End

of the Tendon is also perforated on its In-side in two Places by the same Needles, and the Ends of the Thread tied upon a Compress or Bit of Leather.

Fig. 5. Exhibits the Shape of a Ferula to be made of thin Wood or stiff Paste-board, to extend the Fingers in a Suture of the Tendons on the Back of the Hand.

Fig. 6. Represents GARENGEOT's small crooked Needle for the Suture of Tendons, which the Moderns think more handy than the straight one, as it may be better held, and transmitted through the Tendon: but it has no sharp or cutting Edges at its Point like the common crooked Needles in *Tab. I.* lest it should wound the transverse Fibres of the Tendon. Its Author thinks there might be a sharp Edge in its concave Part A: but I rather think it should be on the Convexity B. The Eye of this Needle is not made Side-ways, as is common, but answering to its Concavity and Convexity, for the more easy Transmission of the Thread. This small Needle is for the lesser Tendons, as those in the Hands: but for the larger, as the *Tendo Achillis*, the Needle must be proportionably bigger, as at *Fig. 9.*

Fig. 7. Shews the Method of uniting the *Tendo Achillis* by Suture, as taken from KISNERI *Dissertatio de Tendinum Læsionibus*. A the Bottom of the Calf of the Leg; B the *Os Calcis* into which this Tendon is inserted or fixed; C the Wound or Division of the Tendon: D the Knot of a strong double Thread, intercepted by the square Bit of Leather E; F the same Thread fastened by the Slip-knot GG, upon another square Piece of Leather. But the Generality of Surgeons chuse to perforate the upper Part of the Tendon first, and to make the Knots upon its lower End.

Fig. 8. Exhibits a large, strong, and straight Needle with a flat Point, recommended by some for the Suture of the *Tendo Achillis*, and Tendon of the *Extensores Tibiæ*. BB the double-waxed Thread armed with the Knot C at its Extremity.

Fig. 9. Is a large crooked Needle like that at *Fig. 6.* for the Suture of the *Tendo Achillis*.

Fig. 10. Shews Mr. COWPER's Method of making the Suture on the *Tendo Achillis*, agreeable to the Case which we before inserted from him, in the *Philosophical Transactions*, N^o 252. AB the two Ends of the divided Tendon, perforated by the two straight Needles C, D, armed with two Threads, by tying which the divided Ends AB, were conjoined; *ab* denote two Incisions in the Integuments, to give free Access to the Tendon.

Fig. 11. Is a Kind of Stocking made of Leather, or coarse Linen, to be fastened tight about the naked Legs by the Lace B, to be constantly wore for Varices and œdematous Swellings of the Legs.

Fig. 12. Represents a Pair of strong Scissars for extirpating Part of the Great-toe Nail, when it runs into the Flesh. It has one obtuse Point A, to rest easy upon the Flesh. BB its two Handles, which are thrown open by the Spring C.

Fig. 13. Is a Pair of Nail-scissars, described and recommended by GARENGEOT in his *French System of Instruments*. The cutting Parts AA, are concave and sharp-pointed, and its two Handles BB are flung open by the Spring C.

Fig. 14 and 15. Exhibit the Boots of AMB. PAREY for Children, who are either *Vari*, having their Feet inflected inward, or *Valgi*, having their Feet incurvated outward.

Fig. 15. Shews the same shut by three small Hooks, as the preceding represented it open.

Fig. 16. Is another Machine for the Bandy-legged, proposed by HILDANUS, *Cent. VI. Obs. 89 and 90.* AA the two Sides made of Hide-leather, Iron-plate, or Brass, according to the Age and Strength of the Child to which they must be made sizeable. BB is a Piece of soft and flexible Leather by which the two Sides are connected; CC the two Ligatures on each Side, by which the Machine is fastened tight about the crooked Leg.

Fig. 17. Represents the preceding Instrument fastened upon the Leg, which is explained by the same Letters: but the inner Side of the Instrument can be here viewed,

INSTITUTIONS

OF

SURGERY.

PART the THIRD.

CHAP. I.

Of Bandages in general.

Use of Ban-
dages.

I. **T**HE great Use and Necessity of Bandages in relieving and curing the Disorders of human Bodies, is very apparent, not only from their being thought worthy to be made an important Subject of Consideration by the first Fathers of Physic, as HIPPOCRATES^a and GALEN^b, with other eminent Physicians; but also from there being hardly any one Operation in Surgery practicable without their Assistance. Even when an Operation has been performed, in all other Respects, with the greatest Judgment and Dexterity, yet if the Surgeon miscarry in his Bandage, by an unskillful Application thereof, all his other Endeavours, though just and laudable, may either totally, or in a great Measure prove fruitless, to the great Damage of his Reputation: and this more especially in the Treatment of Wounds, Fractures, Luxations, Amputations, and the like. We may add, that in Fractures and Luxations, after a Reduction of the Parts, the whole Cure depends intirely on the Bandage: and, in many profuse Hæmorrhages, nothing can afford so certain and speedy Relief, as an exact Deligation of the Wound with a fit Compress and Bandage, which may even save the Life of the Patient, as every one knows that has the least Knowledge of the Nature and Treatment of Wounds. To say nothing of the Recommendation, that the Neatness and Readiness of making a Bandage and Dressing will give the Surgeon, both as to his Patient, and the Spectators, who judge of his other Abilities by his Performance of what comes under the general Cognizance of every one's Senses,

^a Lib. de Officina Medici.

^b Lib. de Fasciis.

as GALEN^a justly observes. And therefore we shall think our Time well improved in making a more strict and ample Exposition of what has been hinted in general upon this Subject in our Introduction, and in considering the particular Make and Application of every single Bandage used in all the Operations of Surgery.

II. A Bandage is a Piece of strong Linen-cloth, of a convenient Size and Shape, suitable for some particular Part of the Body, which it is to invest. Sometimes Bandages are square, like an Handkerchief, or a Napkin, or of other Shapes: but generally they are long and narrow, when designed for Wounds, Fractures, Luxations, or to retain the Dressings on most Parts of the Body. The French Surgeons make a Distinction betwixt a *Band* and a *Bandage*. The first is the loose Cloth before its Application, and, by the last, the Band as it is fixed upon the Body.

A Bandage described.

III. The Kinds of Bandages are various. Some are common to several Parts of the Body; others are *proper* to one only: some again are *simple*, and others *compound*. The simple Bandages are those without any Slits or other Pieces joined to them. With regard to these, it is necessary to observe, that the Cloth of which they are formed, should be cut according to the Course or Length of the Threads or Piece, and generally about two, three, four, or more Fingers Breadth, according to their particular Use, and the Size or Form of the Patient's Limb. These simple Bandages are commonly rolled up at one or both Ends, for the more commodious Application of them to the Parts affected, and then they are denominated single or double-headed Bandages or Rollers. The Figure of one with a single Head may be seen in *Tab. II. Fig. b.* and a double-headed one at *Fig. c.*

Kinds of Bandages.

IV. There are chiefly four Ways of applying a simple Bandage or Roller, which are distinguished by different Denominations. The first is the *circular* or annular Bandage, which is when the upper Rounds come exactly over the undermost. 2. The *Spiral*, when the Turns of the Roller either ascend or descend upon each other in a spiral Form, like a Screw, termed by the French, *Doloires*. 3. The *Rampant*, which is, when the Turns of the Spiral ascend or descend upon the Part at such a Distance (more or less) as not to touch each other, leaving intermediate Spaces uncovered. 4. The *Reinversed*, when the Declivity of the Limb, as the Leg, requires the Roller to be inverted, or half-twisted at each Round, to make it set tight, smooth, and even.

Kinds of Bandages made with the simple Roller.

V. Compound Bandages are those which have Slits, Apertures, or are made up of several Pieces (or simple Bandages) joined together by Suture; as that with four Heads, a Hole for intercepting the Chin, Nose, &c. Some Figures of these Bandages may be seen in *Tab. II. Fig. d, e, f, g, h:* to which we may add, the Bandage with eighteen Heads, used in compound Fractures, represented in *Tab. IX. Fig. 4. B B.* Some of the compound Bandages are denominated from the particular Parts to which they are applied, whether in the Head, Thorax, or Abdomen. Some take their Names from several Things which they resemble in Figure, as the *Scapha*, *Stella*, *Stapes*, *Spica*, &c. And others a-

Compound Bandages.

^a Lib. de *Fas. iis*, where he directs: *Quod injicitur, celeritur, jucunde, prompte & eleganter injicitur.*

gain are denominated from their particular Uses, retentive, uniting, expulsive, &c. as may be seen more particularly in our following Discourse.

Matter and
Formation
of Bandages.

VI. The Matter of which Bandages are generally composed at present, is Linen-Cloth. The necessary Conditions of which are, first, that it should be *clean*, partly for Neatness, and partly that it may not prove offensive to the Wound: for, as GALEN says, the Surgeon ought to aim at Neatness and Cleanliness, as well as Usefulness in his Dressings. 2. That it should be *soft*: for which Reason, that which has been wore some Time is better than quite new; which last would, by its Asperity, be apt to irritate, inflame, or make the Parts itch. Yet it ought not to be wore thin, as that will make the Bandage subject to give way too much, or even to break. It should be *strong*, consisting of Threads, neither very coarse, nor very fine: since the first will make the Bandage sit uneasy upon the Part, and the other will render it liable to break or stretch. 4. It should have *no Hems, Knots, nor loose Threads, nor any Seams* in it, that can be avoided: but if the great Length of the Bandage requires the last, they should be as few and as even as possible, for the same Reason that it should be free from Knots and Hems. 5. And, lastly, the Length and Breadth, which every Bandage ought to have, cannot be ascertained in the gross, but must vary at the Discretion of the Surgeon, according to the Size or Age of the Patient, with the particular Part affected. However, that Beginners may have some loose Idea in this Affair, we shall prescribe a certain Length and Breadth to the several Bandages hereafter described.

Tension of
the Ban-
dage.

VII. It is a very necessary Circumstance to be observed with regard to Bandages, that they be neither drawn too tight nor left too loose, but retain a moderate Tension. For too great Tension of them will occasion violent Pains, Echymosis, or a livid Tumor with Inflammation, a Gangrene, and even a Mortification of the Part: whereas, on the contrary, when they are too lax, they prove of little or no Service, especially in Fractures, Hæmorrhages, &c. You may judge whether your Bandage be over-tight, partly by endeavouring to pass your Finger under it, and partly from the Complaint of your Patient, and Appearance of the Part affected. If the Part does not at all swell, nor give the least Uneasiness to the Patient, you may conclude your Bandage to be too slack. But if your Patient complains of violent Pain, and you observe a very tense and livid Tumefaction of the Parts below, and no Appearance of the Veins above, you will then have Reason to judge your Bandage too strict: as it must be too lax when there is no Tumor and Resistance at all, so that you may easily thrust your Finger underneath. In the Application of a Bandage with one Head to any of the Limbs, it is necessary to fasten it on by two or three circular Rounds one upon the other, to prevent it from slipping or giving way. But if the Bandage or Roller be double-headed, you are then to apply the Middle of it first, and then roll the two Ends of it tight about the Limb: but here the two Ends of it should, for the greater Security, be twisted together two or three Times before they are pin'd. It must be observed, that all Bandages and Compresses for Fractures and Luxations, ought never to be applied dry, but always moistened in warm Wine or Vinegar: which will not only make the Bandage adhere more firmly, but also at the same Time strengthen the Part, and abate or prevent its Inflammation. Lastly, if the Parts under

der the Bandage itch intolerably, after relaxing the Bandage a little, you may bathe them with *Oxycrate*, or wet the Parts and Bandage with Vinegar without any Relaxation, when that may be dangerous.

VIII. In removing the Bandage and Dressings, in order to renew them, you should be very careful not to pull them off too hastily or roughly: for the Bandage communicating with the Compresses and Pledgets, and these last with the Lips of the Wound and Fragments of the Bone, you might, by such heedless Precipitation, induce a dangerous Hæmorrhage, and other bad Symptoms. And for the same Reason, when your Bandage is perceived to adhere fast to the Skin, being glued thereto by the Blood, or Matter dried, you ought always, in that Case, to moisten it first with Wine, or its Spirit, and then to take it off very gradually. You ought also to take care that your fresh Bandage, and other Dressings, are all prepared in Readiness to apply to the Parts, before you take off the old; otherwise the Wound might be injured by being long exposed to the cold Air.

Renewal of
Bandages.

IX. Though we have briefly hinted at some of the general Uses of Bandages in the first Section of this Chapter, yet it may not be here improper to consider some of their other Uses, which are more particular. And, first, they are often Medicines of themselves, being the sole Application for the Cure of the Disorder; as in many Fractures, Luxations, Hæmorrhages, &c. They are also as often, or more frequently, applied to retain other Medicines and Dressings upon the affected Parts; and are therefore styled *containing* Bandages. Sometimes Bandages are used to reduce and prevent the Enlargement of Tumors, and then they are usually denominated *expulsive*. The Method of applying them for this Intention in the Legs when they begin to swell, is to begin at the Tarsus and Ankle, and to ascend a little with every Round, as in *Tab. III. Fig. 1. F.* But sometimes these expulsive Bandages are not only used for swelled Legs, but also to discharge the offensive Matter in Fistula and Sinuous Ulcers. 'Tis also a very considerable Use in Bandages, to restore deformed Parts to their natural Shape: and recent Wounds themselves will very often unite without any thing more than dry Lint with a fitting Bandage, especially in the fore or hinder Parts of the Head, and in the Abdomen, and then the Bandage is commonly termed *uniting*: See *Tab. XXXVII. Fig. 2 and 3.* As for the other most particular Uses of Bandages, applied to all the several Parts and Disorders of the Body, that will in a great Measure be the Subject of our Consideration in the several succeeding Chapters: in which we shall endeavour to describe, by Words and Figures, in the plainest Manner both to the Eye and Understanding, all the most considerable Bandages that are, and may be used upon all Occasions in the Art of Surgery, and from whence the Reader will easily be enabled to invent, and contrive others for any more particular or extraordinary Cases that may occur in his Practice. Though it must be indeed confessed, that the Doctrine of Bandages may be much more readily and exactly learned from inspecting the Examples and Demonstrations made by an expert Master, than barely from Books alone. Nor is the Counsel of GALEN to be despised, who advises young Surgeons to make themselves expert and ready in this important Branch of their Profession, by the frequent Application of Bandages upon a sound Person: in Defect of which they may commodiously use a Statue made of Linen, and stuffed

Use of Ban-
dages.

in the Shape of a Man. The using of a Statue has also this Advantage over a living Person, that the Operator may maim and dismember it at Pleasure, to apply the several Bandages for Amputations, &c. which cannot be done upon the other. And, lastly, for the Order or Method in which we shall consider and describe the several particular Bandages; you may observe, that we shall begin first with those of the Head, then of the Neck, Thorax, and Abdomen, with those of the upper and lower Extremities.

C H A P. II.

Of the Bandages belonging to the Head.

The simple
or trian-
gular Ker-
chief.

I. **T**HAT the Ancients had a prodigious Number of Bandages for the several Disorders of the Head, may appear from the Writings of GALEN^a, and others, on this Subject. But as they also appear to have greatly multiplied their Number without any Necessity or Advantage, the Moderns, particularly VERDUC and LE CLERC, have judiciously endeavoured to ease the Learner in this Branch, by rejecting a great many of those which are obsolete and unnecessary; yet so as to retain many which they describe, and are really useful for the several chirurgical Disorders and Operations in the Head. Among these, the first is the *simple, or triangular Kerchief*, termed by the French, *le Couvre chef en triangle*, represented *Tab. XXXVII. Fig. 1. a a, b*. This Bandage may be made of a square Handkerchief, Napkin, or a square Piece of Cloth folded together in Form of a Triangle, and applied with the Middle of its longest Side upon the Forehead, bringing its two lateral Angles close round the Head, and tying them behind over the other Angle, as is often done by Men who thus apply their Handkerchief instead of the common Covering of their Head, when their Exercise is in sultry Weather. The Application of this Bandage is exceeding easy, and its Uses extremely numerous; as it may be applied, not only in Wounds, but in almost all other Disorders and Dressings of the Head, as any one may perceive by the Figure itself. But if the Knot *b* proves uneasy upon the Patient's Occiput, that Part of the Bandage may be turned round to the Forehead, and there fastened with Pins.

The Grand
Kerchief.

II. The second Bandage of the Head, which is larger than the former, is termed the *Grand-Kerchief*, (*le grand Couvre-Chef*); the Figure of which is represented in *Tab. III. Fig. 1. A.* and the Method of applying it described at *Sect. LXVII.* of our Introduction. 'Tis almost constantly used after the Operation of trepanning or boring the Cranium, and in dangerous Wounds of the Head, &c.

Sling with
four Heads.

III. The third Bandage of the Head is a Kind of *Sling with four Heads*, *Tab. II. Fig. d.* formed of a Slip of Linen about an Ell long, and six or eight Fingers Breadth; though some will have it to be a Foot broad, and others make it but

^a Consult GALEN *de Fasciis*, as also GESNERUS, who are both excellent Writers on this Branch of Surgery: they describe and figure seventy different Kinds of Bandages for the Head only.

three Feet in Length : and indeed we may allow of some Variation according to the Difference of Heads, and Methods of applying it. 'Tis generally used for retaining Dressings on a Wound of the Head in hot Countries and Seasons, where the two preceding, and especially the last might be too thick and cumbersome. The Band is slit up at each End, but not too near the Middle, leaving a little more than an Hand's Breadth intire. See *Tab. II. Fig. d.* To apply it, suppose for a Wound in the upper Part of the Head, the unslit Part of the Bandage is to be fixed upon the Compress and Dressings, and there held by the Hand of an Assistant, while the Operator carries the two posterior Heads down under the Chin, tying them in a Knot as at *Tab. III. Fig. 1.* If the Bandage is long enough by crossing them there, and carrying them back to the Neck, where they may also be fastened by a Knot, or pin'd^a; the two foremost Heads are then to be fastened by a Knot under the *Occiput* : or in a long Bandage, they may cross each other there like an X, and then be carried up over the Ears, and tied upon the Forehead, or under the Chin.

IV. Some Surgeons use, instead of the preceeding, a *Sling with six Heads*, about three Feet long, and one broad, sufficient to take in the whole Head. An Idea of it may be had from *Tab. XXXVII. Fig. 19.* supposing the two Apertures to be absent. The Middle of the Bandage being applied and held to the Vertex of the Head by an Assistant, the two middle Heads are then to be tied under the Chin, *Tab. XXXVII. Fig. 2. a a a* : the two anterior Heads are to be tied or pin'd under the *Occiput b*, and the two posterior Heads fastened upon the Forehead *c c c*, by the Knot *d*. Some will have this Bandage to be much larger, and the Application of it to be made by beginning with the posterior Heads : but these are Matters of no Consequence. As this Bandage, when it is justly applied, will stick close to the Head, and very well retain any Dressing upon that Part, when wounded, &c. I think we ought not to reject the Use of it. I shall here observe, once for all, that when we mention an Ell long, &c. you are to understand the *Paris Ell*, which is near four *English Feet*, as Merchants are well acquainted with. And this I thought necessary, to prevent Mistakes from the Variation of this Measure in different Countries.

A second Sling with six Heads.

V. The fourth Bandage of the Head is by Surgeons termed from its Use, the *Uniting or Incarnative*. It is about two Ells long and two Inches broad, having a longitudinal Fissure or Slit in its Middle, about the Length of three or four Fingers Breadth : (See *Tab. II. Fig. f.*) it is then rolled up at each End. The chief Use of this Bandage is to retain the Lips of a rectilinear Wound close together, whether in the Head, Eye-lids, or other Parts of the Body. See *Tab. XXXVII. Fig. 3. and 4. a a*. For the Method of applying it; after the Wound has been dressed with proper Balsams, a Plaster and two narrow Compresses, laid one on each Side, the slit Part of the Bandage *b*, is then to be fixed near the Wound in such a Manner, that one of its Ends *c*, being carried round the Head, and its Roller being passed through the Slit, both of them *d d*, are then drawn tight, so as to bring the Lips of the Wound

Uniting Bandage of the Head.

^a As Bandages of the Head being fastened by a Knot in the Neck, may be uneasy to the Patient in sleeping on his Pillow, if the Ends will not reach to tie upon the Forehead, they had better be sew'd or pin'd.

close together. The two Rollers in each Hand being then exchanged, and crossed upon the Forehead, as in *Fig. 3.* and the like being done under the *Occiput* and Chin, as long as the Bandage will permit, each End of it is fastened, as in other Bandages, either by Pins or Suture. If the Wound be too long for its Lips to be thus approximated, you may in that Case make another Slit in the most convenient Part of your Bandage, and so transmit and exchange your Rollers as before, which will promote not only the Agglutination of the Wound, but also the Uniformity of the *Cicatrix*. This Bandage should not be taken off for six, eight, or more Days after its Application, when the Lips of the Wound may be supposed to have united; unless any urgent Symptoms should require its Removal.

Bandage for
Bleeding in
the Fore-
head.

VI. The Bandage usually applied after Bleeding in the Forehead, is about three Ells long and two Fingers Breadth. It is rolled up with but one Head, and may be applied after two different Manners: one of which is called the *Discrimen*, and the other the *Scapha*.

1. *Discrimen*.

The *Discrimen* is made by so placing the Bandage with the left Thumb upon a Compress covering the Wound or Puncture *a*, *Fig. 5.* as to let about a Foot of it hang down from the Forehead over the Face. After which, the Roller End of the Bandage in the right Hand is carried round the Temples and *Occiput*, 'till it comes again to the left Thumb upon the Forehead, in the circular Direction *b b*. The pendulous Part of the Bandage is then turned back upon the Forehead over the circular, coming down from the *Vertex* over the *Occiput*, in a strait Direction upon the sagittal Suture *c*, its End being fastened upon the *Occiput*, by continuing the Roller End of the Bandage circularly about the Head as long as it will reach; fastening its Extremity, either by Pin or Suture, upon the Part where it terminates.

2. *Scapha*.

In the *Scapha* the Bandage is carried round the Head in an oblique Circle (*Fig. 6. a, b.*) above the right Ear *b*, to the *Occiput*, and then under the left Ear, and again to the Forehead: then the pendulous Part is reflected back obliquely above the Ear on the other Side of the Head to the *Occiput*, forming a kind of Angle there, and upon the Forehead; so that the Parts *a, b, c*, invest the Head like a Boat, whence its Name. The Remainder of the Bandage is to be carried circularly round the Head, and fastened, as before, in the *Discrimen*.

Bandage for
Arteriotomy.

VII. The seventh Bandage of the Head is, from the Manner of its Application, sometimes called *knotted*, from its many Crossings on the Temples; and *stellar* or *solar*, from its Direction in *Radii*; making a very useful Bandage, when the temporal Artery is divided either in Arteriotomy, or by an accidental Wound, hardly ever failing of Success in suppressing the Hæmorrhage. The Slip of Linen for this Bandage ought to be five or six Ells in Length; of two Fingers Breadth, and rolled up with two Heads. For the Application of it, after the Wound has been covered with three thick Compresses, each larger than the other, the Middle of the Bandage is then applied to the sound Temple opposite to the Wound, (*Tab. XXXVII. Fig. 7.*) and bringing one Head of it round the Forehead *a*, and the other round the *Occiput. b*, they then meet,

2 And I therefore wonder it should be omitted by several of our modern Writers.

and

and cross each other upon the Part affected *c*, forming a Sort of Knot, from whence one Roller is carried under the Chin *d*, and the other over the *Vertex* of the Head *e*, both of them crossing each other again upon the sound Temple on the right Side. Then the two rolling Heads of the Bandage are carried round the Forehead and *Occiput*, to the Compresses on the Part affected *c*. And thus you are to continue 'till the Bandage is spent, when the two Extremities are to be fastened by Suture.

VIII. Almost the same Kind of Bandage may be successfully applied, with a little Variation, to suppress the Hæmorrhage after Wounds in, or an Extirpation of, the Parotid and maxillary salival Glands, when they are become scirrhus. In these Cases, after the Parts have been dressed with Styptics, Lint, and Compresses, the Bandage is then fixed upon the sound Side, as before, after Arteriotomy. (See *Fig. 8. a, b, c, d, e.*) But after the first Circumvolution all about the Head in that manner, I often repeat the Tract (*d, e,*) over the *Vertex*, and down under the Chin, and seldomer that round the Forehead and *Occiput*, than in the preceeding Bandage: and instead of making the Knots or Crossings upon the Temples, as before, they are here fixed upon the Parotid, or wounded Part, under the Ear, at the Angle of the Jaw *f*. By frequently repeating them there, the Lint and Compresses are so strongly pressed upon the Part, as to prevent any Danger of a succeeding Hæmorrhage, always fastening the Extremities by Suture, to prevent their getting loose. I was obliged to contrive this Bandage when I first undertook the Extirpation of the forementioned scirrhus Glands, where I found it answer Expectation: nor is it without Reason that these two Bandages are called *knotted*, from their many prominent Crossings.

After an
Extirpation
of the Pa-
rotids.

IX. The reflex Bandage of the Head, for an *Hydrocephalus*, termed by the French a *Capeline*, is about six Ells long, two Fingers Breadth, and rolled up with two Heads. It is applied by fixing its Middle upon the *Occiput*; and, after one or two circular Rounds, the two Rollers are then made to traverse or decussate each other upon the Forehead and the *Occiput*. Then one Roller being reflected a-cross over the *Vertex* and sagittal Suture to the Forehead, (*Fig. 9. a.*) and the other carried in a Circle by the Side of the Head *b, c*, they both cross each other upon the Forehead. After this, the first Head of the Bandage is carried obliquely towards the *Occiput c, d*, and is re-inversed by the Side of the other, *a*; which last is continued in the circular Direction *b, c*, and then first carried from *e* to *f*, then from *g* to *b*, crossing, while the other still continues its circular Course. When this Reversion has been continued till the Head is covered, and the Bandage almost spent, in order to fasten down the Reversions of the Bandage *cd, ef, gb*, which traverse each other obliquely, you are to finish by carrying one End over the sagittal Suture *a*, and the other End in a circular Direction round the Head *bc*. Some recommend this Bandage for the Head-ach, as well as an *Hydrocephalus*: but of how little Service it can be of in the last, we may conclude from the Observation of NUCKE in *Exper. Chirurg.*

The Capeline for an
Hydrocephalus.

XVII.

X. We come now to those Bandages of the Head which are destined to the Eyes: of which there are two Kinds, termed the *Monoculus* and the *Binoculus*, according as they take in either one or both of the Eyes. The first of these

The 'Monoculus.

Bandages

Bandages is two Ells and a Half or three Ells long, and two or three Fingers Breadth, according to the Bulk of the Patient, and serves to retain the Dressings upon either of the Eyes, or their Lids, in their several Disorders. For the Application of it, you place the End of the Bandage, which is rolled up with but one Head, upon the *Occiput*, and from thence carry it obliquely round the Head and Ear of the affected Side, so as to cross over the Compress and Dressings upon the Eye, (*Fig. 10. a a*) and so obliquely over the Forehead *b*, down to its Beginning at the *Occiput*. When you have thus carried your Bandage thrice obliquely round, the rest is to be spent in a circular Manner *c c c*, upon the Temples, *Occiput*, and Forehead, fastening the End where it terminates. A Bandage or Sling for one Eye may be also very easily applied as represented at *Fig. 11.*

The Bino-
culus.

1. With one
Head.

XI. The Bandage for investing both the Eyes is generally termed *Binoculus*, being about three Ells long, and as many Fingers Breadth. There are two Ways of applying it, according as it is rolled up with one or two Heads. When it has but one Head, the End of the Bandage is first applied, and held upon the *Occiput*, as in the preceeding: from thence it is carried round by the left Ear *a*, (*Fig. 12.*) and Eye *b*, obliquely to the right Side of the Forehead *c*, and from thence to where it began at the *Occiput*. Then it ascends obliquely again to the Forehead *d*, thence crossing over the other Eye *e*, from whence it descends again to the *Occiput*, crossing the former Round upon the Nose, in the Shape of an X. Having repeated these two oblique or intersecting Circles thrice with your Roller, the rest of the Bandage is to be spent in a plain Circle round the *Occiput*, Temples, and Forehead, in the Direction of *g g g*, fastening the End wherever it terminates.——2. When this Bandage is rolled up with two Heads, then its Middle is applied to the *Occiput*, and the two Rollers carried round on each Side by the Ears, and over the Eyes, *Fig. 12. a, b, f, e*, crossing each other like an X upon the Nose, where the two Rollers exchange Hands and Directions, passing over the Temples *a, c*, again to the *Occiput*, where they are again crossed and exchanged, and so brought round and crossed upon the Nose as before. Which Course being repeated thrice, the Remainder of the Bandage is applied in a plain circular Direction round the Head *g g g*^a. The Application of this Bandage, when both the Eyes are affected, may be very well supplied by the Sling *Fig. 11.* If two are applied, one on each Eye, and their Ends tied with a Knot upon the *Occiput*, or after crossing each other there, they may be pin'd near the Ears or Temples.

Sling for the
Nose.

XII. There is one Bandage or Sling which very well supplies all Occasions of the Nose^b, being usually about an Ell long and three Fingers Breadth, slit at each End, and rolled up with four Heads. The Slits are continued almost to the Middle, leaving but about two Fingers Breadth entire. Betwixt the two Slits is made a small Aperture to intercept the *Apex* of the Nose, and hold the Bandage firm. See *Fig. 13. a*. The chief Use of this Bandage is for

^a The Method of applying these Bandages for the Eyes, is delivered in a very different, but much more obscure and intricate Manner by GALEN, in his Book *de Fasciis*.

^b The Ancients have invented and described two other Bandages, besides this for the Nose, one of which they call *Accipiter*, and the other the *Fossa* of AMYNTAS. But as those rather disturb than retain the Bones of the Nose in their proper Places, HIPPOCRATES justly advises to reject them, since a Plaster only will generally suffice for their Support.

Fractures of the Nose, or to retain the Dressings in Wounds and Inflammations of that Part, or after the Extirpation of a *Polypus*, or making a Perforation when the Nostrils are obstructed by some Membrane, &c. It is applied by fixing its Middle upon the *Apex* of the Nose, and carrying its two upper Heads *b b*, backward to the Neck on each Side, where crossing each other, they are carried up, and tied upon the Forehead *c c*, by the Knot *d*: but the lower Heads of the Bandage *e e*, are carried a little upward over the Cheeks and Temples *f*, and then crossing upon the *Occiput*, are tied like the preceeding upon the Forehead *g g*. We shall conclude with this general and necessary Observation, that in all four-headed Bandages, the two uppermost Heads are to be carried not directly backward, but a little obliquely downward, and the two lower a little obliquely upward, crossing each other as in this Figure, to retain the Parts more firmly.

XIII. When the lower Jaw is fractured or dislocated on either Side, the Surgeon must apply the Bandage termed a single *Bridle* (*Capistrum simplex*) which is near four Ells longs, about two or three Fingers Breadth, and rolled up with one Head. It is thus applied: The Luxation being properly reduced and dressed, the loose End of the Bandage is to be fixed on the *Occiput*, and fastened there by making two Circumvolutions about that and the Forehead, *Fig. 14. a, b*. Then the remaining Part of the Bandage being made very fast to the other, either by pinning or sewing upon the Temple of the affected Side *b*, is carried down over the Cheek *c*, and under the Chin *d*; and from thence it is conveyed up on the sound Side of the Head over it *Vertex e*, again to the affected Side *b, c, d*. After this Process has been thrice performed, the remaining Part of the Bandage is carried from the Throat to the Neck, under the Ear, and so round upon the anterior Part of the Chin and lower Jaw affected, *f, g*; from whence again it passes under the Ear on the sound Side, round the Neck, and so over the Chin once more. Lastly, the remaining Part of the Bandage, if there be any, is carried from the *Occiput* to the Forehead, falling into the Circle *a b*, till it is spent. But you must observe that, in order to keep this Bandage tight and fast upon the Parts, the crossing of it *b, f*, upon the Temple and the lower Jaw ought to be sewed or pin'd together. This Bandage is equally applicable as well for Fractures as Luxations of the lower Jaw.

The single
Bridle.

XIV. When both Sides of the Jaw are fractured, after the Reduction you must apply the *double Bridle* (*Capistrum duplex*) which is a Bandage six Ells long, and two or three Fingers Breadth, rolled up with two Heads. The Fracture being reduced, and the Dressings held on by an Assistant, the Middle of the Bandage is placed under the Chin, (*Plate XXXVI. Fig. 15. a, b,*) and from thence carried up on each Side of the Jaw and Temples, the Rollers crossing each other upon the *Vertex c*, from whence they are carried down again under the Chin as before, repeating this Course three Times: and after the last crossing upon the *Vertex*, they must descend from thence to the Neck, where they are crossed, and then carried on each Side, so as to pass round the anterior Part of the Chin and lower Jaw *d, e*, and round again to the Neck. From whence, after crossing, they proceed to the Forehead, where they form the circular Turns *b, f, f*; and then not only the Ends of the Bandage, but also its Crossings upon the *Vertex* and Temples, are to be well fastened by Pins or Su-

The double
Bridle.

ture. But after all, the preceding simple Bridle appears no less suitable for the same Purpose than this, which is more complex.

Sling with
four Heads
for the Jaws.

XV. There are some Surgeons, who, instead of the Bridle, use a Sling or four-headed Bandage, a little above an Ell long, and of four, five, or six Fingers Breadth, being perforated in the Middle for intercepting the Ball of the Chin, which, though more simple than the former, answers the same Intention extremely well; see *Tab. XXXVII. Fig. 16.* After the Fracture or Luxation has been reduced, and the proper Dressings applied, the Chin is then let into the Aperture in the Bandage *a*, *Fig. 17. a*, and then the two upper Heads are carried back to the Neck, where the Rollers or Ends being crossed and exchanged on the *Occiput*, are from thence conveyed to the Forehead *c c*, and there tied by the Knot *d*: but the two lower Ends of the Bandage *e* are carried upwards by the Sides of the Cheeks *f*, to the Crown of the Head, and there fastened by the Knot *g*, or else carried down again, when the Bandage is long enough, and tied under the Chin.

Bandage for
the Lips.]

XVI. After the Operation for the Hare-lip, Wounds, &c. for retaining the Dressings, Surgeons apply a Kind of Sling with four Heads, almost like that for the Nose, described in Sect. XII. but no more than an Inch broad. This Bandage is applied by fixing its Middle, which is without any Slit, upon the Lip *a*, *Fig. 18.* and then the two upper Ends *b b* are first carried back to the Neck, and from thence to the Forehead, upon which they are either tied by the Knot *c*, or else pinned: but the two lower Ends *d d* are carried a-cross the Cheeks *e e*, to the *Occiput*, and from thence to the Forehead, where they are fastened like the former. I know that some Surgeons apply the uniting Bandage *Tab. II. Fig. f*, of an Ell long, and a Finger's Breadth, having a longitudinal Slit in its Middle about two Fingers Breadth long, which they apply to the Hare-lip, in the same Manner as we directed for the uniting Bandage of the Forehead. See *Tab. XXXVII. Fig. 3.* But that Kind of Bandage is not only less convenient for this Use, as it compresses the Needles too violently, but it is, on many Accounts, even injurious and improper, as we are assured both from Reason and Experience.

The Mask.

XVII. When the whole Face has been burnt by Gun-powder, or other Fire, we usually form a Piece of Linen-cloth into a Kind of Mask, with Apertures for the two Eyes, Nose, and Mouth: which Cloth being dipped in some Oil, Ointment, or other Medicine for Burns, as we before directed in our Chapter on that Subject, is then commodiously applied to the Face, and fastened behind the *Occiput* by six Tapes, or Slips of the same Piece of Linen. This Mask may also serve to retain the Dressings for a *Pblegmon*, *Erysipelas*, or other Disorder of the Face.

C H A P. III.

Of Bandages for the Neck.

The Divider
for the
Neck.

I. **A**MONG the Bandages commonly used for the Neck, the first that deserves our Consideration is the *Divider*, so called from its dividing or drawing

drawing back the Head, that it may not grow to the Breast, nor be contracted forwards, in Burns of those Parts. 'Tis made of a slip of Linen six Ells long, and about two or three Fingers broad, rolled up with two Heads. The burnt Parts being dressed, the Middle of the Bandage is applied upon the Forehead, making two Rounds there about the Head, Plate XXXVII. *Fig. 20. a a*, and then one of its Rollers is carried under the right Axilla *b*, and its other under the left *c*, making two Rounds about the Breast *d d*, to keep the Head erect: but then the Parts of the Bandage crossing upon the Head are to be fastened by Pins; see *Fig. 21. a*, either together, or to the Patient's Cap. This done, the two Heads of the Bandage are again carried up to the Neck, where, crossing each other like an X, they then pass over the Forehead, and from the Forehead they go again to the Neck, and so under the Arms; keeping the Head all the Time in an erect Posture, and spending the Remainder of the Bandage circularly about the Forehead and Occiput. When the Bandage slackens, it is to be renewed again, and continued till the Parts are in no Danger of contracting. Some also recommend this for supporting the Heads of Infants, when they cannot hold them upright, through some Weakness in the extending Muscles of the Head.

II. Another Bandage proper to the Neck, is usually termed *Retentive*, as it serves to keep on the Dressings and topical Remedies applied to the Neck after Bleeding, Burns, or any chirurgical Operation in that Part. This Bandage is generally composed of two simple Bands, one of which is about an Ell, and the other an Ell and a half in length, the first being of a Thumb's breadth, and the last of three Fingers, to be applied in the following Manner: First, the Dressings being applied, the shortest of the Bands is to be then laid a-cross the Head over the Vertex, so as to let its two Ends hang down over the Shoulders, as in *Fig. 22. a a*. Then the longer Band is to be applied circularly *b b* about the Neck, and over the other Band, making it as tight as may be without obstructing the Respiration: and when it is thus spent, fasten the End with a Pin. Lastly, the two Ends of the first Band *a a* lying on the Shoulders, are to be next reflected and drawn upwards over the circular one, in the Manner denoted by *c*, fastening them under the Ears, that the circular Bandage may not descend. But, to say Truth, this shortest Band, marked *a, c*, is of little or no Service; because the Shoulders alone are sufficient to prevent the circular Bandage from subsiding, as I have learned from Experience.

Retentive
Bandage for
the Neck.

III. There still remains a third Bandage of the Neck, which is generally applied after the Operation of *Tracheotomy*. Which being performed, and the Cannula fixed in the Aperture made in the *Trachea*, you must then apply a common simple Bandage of about two Foot long, and two Inches broad, perforated in its Middle, and applied over a Plaster, and Compress perforated in the same Manner: and then gently drawing the two Ends tight behind the Neck, they are to be fastened by a Knot there. You may also apply for this same Purpose a Bandage of three Feet long, two Inches broad, and rolled up with one Head. First, fix its End upon the Neck, and then make two circular Turns about the same; but when it comes to the Cannula inserted in the *Trachea*, that Part of

Bandage for
Tracheoto-
my.

^a It must be observed, that a thick Compress ought to be placed under the Bandage at every Time bringing it under the Axilla, to prevent its fretting off the Skin.

the Bandage must be perforated to let the Tube through, and give a free Admission to the Air to come that Way into and out of the Lungs: and the End of the Bandage, wherever it terminates, must be fastened with a Pin. The Bandages are seldom renewed before the Patient has recovered his Respiration: and then the Tube being removed, and the Wound dressed with some vulnerary Balsam and a sticking Plaster, you are to bring its Lips together by Means of an uniting Bandage, (*Tab. II. Fig. f.*) which may be an Ell long, and of two Fingers breadth, applied as in other rectilinear Wounds of the Forehead, &c. (*Tab. XXXVII. Fig. 3. a.*)

C H A P. IV.

Of Bandages pertaining to the Thorax.

S E C T. I.

Of Bandages for the Clavicle, when it is either broke or luxated.

The Cape-
line.

I. **T**H E R E are two Sorts of Bandage for the Clavicle, according as it is either broke near the Sternum or Humerus. For in the first should be applied the *Capeline* (or *capitalis reflexa*) of six Ells long, three or four Fingers Breadth, and rolled up with two Heads; to be applied as we before directed in our Chapter on a Fracture of this Bone, or in the following Manner: The fractured Clavicle having been reduced and retained by proper Compresses and Splints of Pastebord, (*Tab. VIII. Fig. 12.*) the Dressings are to be held on by the Hand of an Assistant, while the Surgeon applies the Middle of the Bandage to the Top of the Patient's Shoulder, *Fig. 23. a.* So that the Roller, on the Fore-side, may pass obliquely over the *Præcordia b.* and the posterior Roller or Head may pass obliquely upon the Back betwixt the *Scapulæ* to the *Axilla c.* on the sound Side; and, passing under the Arm, come a-cross the Breast *d.* and passing over the anterior Roller-head, continues its Course round under the Arm of the affected Clavicle *e* to the Back. Then the anterior Head of the Roller is reflected back again over the affected Shoulder *f.* after it has been crossed and secured by the other Head of the Roller on the Back: which last, being again brought towards the Thorax, is to cross the other upon the Breast, before it is again returned over the Shoulder in the Direction *g, b.* And thus you are to continue as long as the Bandage lasts, or till the Splints, Compresses, and other Dressings are well covered, and firmly secured upon the fractured Clavicle. Lastly, the Ends of the Bandage are to be fastened, by pinning where they terminate, and the Arm must be suspended in a Sling or Sash about the Neck, as at *Tab. XXXVIII. Fig. 17. c c.* When the Surgeon finds it difficult to retain the Fracture by this Bandage alone from the Weight of the Arm, displacing the reduced Fragments, he may, in that Case, assist it by another Bandage, which, in a Manner, draws back and suspends the Shoulders, termed the *Stellate*, from its Figure, and applied as follows.

II. Take a single-headed Roller, of four or five Ells long, and three Fingers breadth; fix the End of it upon a Compress near the Clavicle, or under the Axilla of the sound Side: (*Fig. 24. a*) conduct it from thence obliquely over the same Shoulder, and a-cross the Back betwixt the Scapulæ to the Top of the Shoulder of the fractured Clavicle *b*, and then under the same Axilla *c*; thence obliquely a-cross the Back betwixt the Scapulæ, over the other Shoulder *d*; so that the Courses may intersect or traverse each other like an X in the Middle of the Back. And thus the whole Bandage is to be spent in vertical Turns about the Shoulders, and under the Arms, like an horizontal Figure of (∞). Whenever the Bandage appears slack, it ought to be tightened, or fresh applied about once in two or three Days; but then the Shoulder must be held extended by an Assistant whilst it is off, and at other Times the Patient must constantly keep his Arm in the Sling, *Tab. XXXVIII. Fig. 17.* You may also begin to apply this Bandage by fixing its End upon the Shoulder above the Scapula *d*, instead of under the Axilla; and from *d* you conduct it along by *e* and *c* to *b*, thence by *e* and *a* to *d* again, and so on till it is spent. Lastly, you may observe, that the Machine delineated in *Tab. VIII. Fig. 13.* may be sometimes conveniently used for the same Intention as the present Bandage, and instead of it, as we have mentioned in our Chapter on the Fracture of this Bone.

The Stellate Bandage.

III. When the Clavicle is fractured near the Shoulder, the most convenient Bandage for that Case is the *Simple Spica*, so called from its Intersections, being supposed to resemble an Ear of Corn: it has been also denominated *Geranium* ever since the Time of HIPPOCRATES^a. It consists of a common or simple Band, about five Ells long, and three Finger's Breadth, rolled up with one Head. The Fracture being reduced, and the Compresses or Dressings held on by an Assistant, the End is fixed on a Compress under the Axilla, and the Roller is passed from thence to *a*, (*Tab. XXXVII. Fig. 25.*) obliquely a-cross the Breast *b*, over the fractured Clavicle *c*; then passing backward upon the *Acromion Scapulæ*, it comes up again obliquely from under the Axilla *d*, so as to intersect, or cross over the preceding Round at *c*, where covering the Part affected, it thence proceeds obliquely a-cross the Back, and under the opposite Arm *a*. The Bandage being thrice passed about the Patient in this Manner, the Remainder of it may be either spent in the same Course, or in a circular Direction about the Arm or Shoulder of the affected Side, its End being fastened either by a Pin or Suture. In this Case too the Patient's Arm must be suspended in a Sling. And, above all, the Surgeon must observe, that the Parts are held in their just Position while he applies the Bandage, which should be firm and tolerably tight: the Patient should also keep his Arm quiet, for which End some fasten or bind it to their Breast by a circular Bandage for that Purpose.

The Simple Spica.

Others make their Bandage of the *Simple Spica*, by beginning under the Axilla of the sound Side, *Fig. 25. a*, from whence they proceed obliquely a-cross the Back, and over the other Shoulder, taking in the fractured Clavicle itself *c*; and having passed under the Axilla *d*, it is then carried up on the Back of the

Second Method of applying.

^a See GALEN *de Fasciis.*

Shoulder, and intersecting the former at *c*, it goes obliquely a-cross the Breast *b* to the opposite Axilla *a*, where it began. And thus they continue till the Bandage is spent, fastening its End wherever it terminates. The Usefulness of these Bandages in a Fracture or Luxation of the Clavicle is self-evident: besides which it may be also applied with Advantage in a Luxation of the upper Head of the *Os humeri*, and in a Fracture of its Neck.

Simple Spica
with two
Heads.

IV. This Bandage may be also applied in an another Manner, being something larger than the first, and rolled up with two Heads. In this Method the Middle of the Bandage is fixed under the Axilla of the sound Side, *Fig. 25. a*, its anterior Head passing obliquely over the Præcordia, and its Posterior a-cross the Back to the Shoulder of the affected Side *c*, where the Heads crossing each other, are then carried down, and crossed again under the Axilla *d*, and, rising up, they cross again upon the Shoulder *e*, from whence they are carried one before, and the other behind obliquely upon the Breast and Back down to, and under the right or sound Axilla: where, being again crossed, they continue the same Course as before, till the whole Bandage is spent, and the Clavicle well covered and secured. The same Cautions are here necessary, with Regard to suspending the Arm in a Sling, and retaining the Parts in their due Position, as before.

A fourth
Method of
applying the
Spica.

There is still another Method of applying the double-headed *Spica*, by fixing the Middle of the Bandage under the Axilla of the Side affected, *Fig. 25. d*, then carrying up the two Heads, and crossing them upon the Shoulder *e*; from whence, drawing them tight, they pass a-cross the Breast and Back to the right Axilla *a*, where they cross each other, and then return again by the same Course to the Shoulder *c c*. Then being again crossed, they pass under the left Axilla *d*, where the Bandage first began. And thus the preceding Course must be repeated till the Bandage is spent, and the affected Parts well covered and secured. Some of our modern Surgeons, following GALEN and the Ancients, apply Part of this Bandage like a kind of Sling or Bridle about the lower Arm, in order to sustain it: but as by that Means the fractured Clavicle will be drawn downward by its sustaining the Weight of the Arm, I should rather approve of making a Support or Sling for the Arm to be hung about the Neck, as in *Tab. XXXVIII. Fig. 17*.

GOUEY'S
Method of
applying the
Capeline.

V. We have yet another Method of applying the *Capeline* different from the preceding, though generally neat and commodious, described by Monsieur GOUEY, in his *Chirurgie Vritable*, pag. 108. which Bandage may, in some Respects, be preferred, as being applicable when the Clavicle is fractured in any Part or Direction. His Capeline is six Ells long, three Fingers breadth, and rolled up with two Heads. 'Tis applied by fixing the Middle of the Bandage under the Axilla belonging to the affected Clavicle; (see *Tab. XXXVII. Fig. 25. d*.) and, carrying up the two Roller-heads, they cross each other like an X upon the Top of the Shoulder, and then proceed one a-cross the Breast *b*, and the other a-cross the Back to the Axilla *a*. Here they are crossed, and then carried circularly round the Body, and crossed again under the Axilla of the affected Clavicle *d*, then carried up and crossed upon the Shoulder, as before, and so continued till they return again to where the Bandage began. He then takes the posterior Roller-head, and, bringing it over the Shoulder, crosses and secures it upon the Breast by the other Head (as at *Fig. 23. a, b*.) which is spent circularly round:

round the Body: and after the posterior Head has passed under the anterior, it is then reflected back again in the Direction *f*, and, being secured as before by the circular Turn on the Back, it then returns, and so continues till it is spent, as in Sect. I. of this Chapter. The Author of this Bandage prefers it to any other, as it retains and secures the reduced Fragments of the Clavicle in all Directions, as well downwards as laterally, towards the Sternum and Humerus. M. GOUVEY also judges, that this Bandage is better than the common ones for a Fracture of the Scapula.

VI. The Bandage for a Luxation of the Clavicle is almost the same as for a Fracture of that Bone: *i. e.* after it has been replaced or reduced (according to the Directions given Sect. VI. of our Chapter on a *Luxation of the Clavicle*) a Compress is to be applied dipped in *Sp. Vini*, and retained, if the Dislocation be of that End next the Sternum, by the Capeline Bandage here described at Sect. I. and V. And, if the Clavicle be pressed inward, it will be also necessary to apply the Stellate Bandage at Sect. I. to keep the Shoulders extended, and throw the Clavicle outward. But that Bandage must be omitted when the Bone is dislocated outward, when it will be rather necessary to press it inwards by a tight Bandage and thick Compresses. If that Head of the Clavicle next the Scapula be dislocated, your Bandage must then be the *Simple Spica* of Sect. III. and IV. or that of GOUVEY at Sect. V. preceding. And, lastly, when both of the Clavicles are violently displaced, your Business is then to apply the *double Spica*, in the Manner we shall presently direct for Fractures and Luxations of the Scapula. In the mean Time you must always observe to inculcate this necessary Caution to your Patient, that he may never violently agitate his Arm, or remove it out of the Sling, till the Parts are become firm, to prevent a Relapse of the Disorders.

Bandage for
a luxated
Clavicle.

S E C T. II.

Of Bandages for the Humerus and Scapula.

VII. For a Dislocation of the Humerus, after it has been replaced, and secured from slipping out again, by fixing a Ball in the Axilla, you are then to apply the *simple Spica* described at Sect. I, III, IV, or V. preceding. The Compress here must be a Foot long and a Hand's breadth, slit up at each End, so as to form four Heads, as in *Tab. II. Fig. 18.* This being expressed out of warm Wine, its Spirit, or *Oxycrate*, is to be applied with its Middle upon the Ball under the Axilla, its four Heads coming up over the Shoulder or Head of the Humerus, which they are to invest. You are then to bind up the Part with the *simple Spica*, Sect. III, IV, or V, observing to place a Compress under the Axilla and Bandage, to prevent the Skin from being chafed. This *Spica* Bandage may be also very useful in a Fracture of the Neck or of the *Os humeri*, when the common Deligation for a Fracture of this Bone will by no Means succeed.

Simple Spica
for a Luxa-
tion of the
Humerus.

VIII. If the *Os humeri* of each Arm are dislocated, the most effectual Bandage in that Case is the *double Spica*, as it is commonly called. When you have reduced the Bones, and secured them with a Ball or Pellet of Linen in each Axilla, with Compresses, as in our Discourse on Luxations, you then take a Band about seven or eight Ells long, and three or four Fingers breadth, rolled

The double
Spica.

up

up with two Heads, and fixing its Middle under the Axilla *d*, (*Tab. XXXVII. Fig. 25.*) the two Heads cross each other upon the Shoulder *e*, and go over the Breast and Back to the opposite Axilla *a*. Here they cross again, and then rise up over the other Shoulder as before, from whence they go a-cross the Breast and Back again to the left Axilla *d*, where they began, forming an X by traversing each other upon the Sternum and Back, as you may see more expressly in *Tab. XXXVIII. Fig. 4.* And thus you are to continue your Bandage, crossing the Thorax, and about each Shoulder, till, being near spent, the Remainder may terminate circularly either about the Body, or one of the Arms, fastening its Ends by Pins. This *double Spica* is not confined barely to Luxations of the *Humeri* Bones, but it may be also advantageously applied for Fractures of the Clavicles inflicted near the Shoulders, or in any other Cases where the Shoulders themselves require a pretty tight Deligation.

Bandages for
the Scapulæ.

IX. In a Fracture of the Scapula, after the Reduction, and dressing with Compresses and Splints of Pasteboard, as in our Discourse of these Fractures, you may then take your Choice of three Bandages. The first is the *double Spica* described in the preceding Paragraph. The second is the *Capeline* described in Sect. I. and V. preceding. The third and last is the *Stellate* Bandage delivered in Sect. II. foregoing, and which is the most frequently used for these Fractures, observing that the Scapulæ and Dressings are retained in their due Position during its Application. Though it must be also acknowledged, that the *double Spica* may be used to Advantage, when both Scapulæ are fractured; as any one may conceive from viewing the Course of the Bandage, since it closely invests both the Shoulders and Scapulæ.

AN EXPLANATION of the THIRTY-SEVENTH PLATE.

Fig. 1. Shews the *triangular*, or *simple Kerchief* for the Head, in *French*, *Couvre chef en triangle*: *a a a* the Parts of it, which invest the Forehead, Vertex, and Part of the Occiput; *b* its Corners tied upon the Occiput.

Fig. 2. Represents the Manner in which the *Grand Kerchief*, or six angled Bandage is applied: *a a a* its middle Corners tied under the Chin; *b* one of its anterior Corners, which, with its Fellow, is carried round the Occiput, and fastened on each Side near the Ears; *c c* are the posterior Angles brought from the Occiput to the Forehead, and there fastened by the Knot *d*; *e e* the Middle of the Bandage investing the Head.

Fig. 3. Demonstrates the uniting Bandage of the Forehead: *a* the longitudinal Wound; *b* the slit in the Bandage upon the Wound, through which its other Part *c* is passed; *d d* the two Heads of the Bandage, by drawing which the Lips of the Wound are approximated or conjoined, and then they terminate circularly about the Head.

Fig. 4. Denotes the same Bandage applied to a longitudinal Wound near the Vertex.

Fig. 5. Exhibits the *Discrimen*, or Depart-bandage: *a* the Part where it begins, or where its Middle is first applied; *b b* its circular Turns about the Head; *c* its depending Part reflected back towards the Occiput.



Fig. 6. Represents the *Scapha*, or Boat: *a* the Beginning of the Bandage; *bb* its first Round which is made obliquely about the Head; *c* the Beginning of the second Round continued obliquely from the left Side of the *Occiput*, and meeting with the other like the Ribs of a Boat; *add* the circular Rounds about the Head, in which the Bandage terminates.

Fig. 7. Denotes the Knotted and Solar Bandage for Arteriotomy in the Temple: *ab* the first Round made by the two Roller-heads, the Middle of which being applied upon the sound Temple, is brought round in the Direction *ab*, and crossed upon the Compress on the divided Artery *c*, so as to form a Knot or Protuberance; after which they pass round the Head in the opposite Course *d, e*, under the Chin, and over the Vertex to the sound Temple, where they cross again as before at *c*.

Fig. 8. *Lit.* *a, b, c, d, e*, denote the same Bandage: but with this Difference, that here the Knot *f* is made behind the parotid or salival Gland, here supposed to be extirpated.

Fig. 9. Shews the *Capeline* for an Hydrocephalus: *a* the depending End reflected back from the Forehead to the *Occiput*; *bc* the circular Round about the Head; *d, e, f, g, h*, the other oblique or reflex Turns which invest the Head.

Fig. 10. Demonstrates the Bandage denominated *Monoculus*, for the binding up of one Eye: *aa* denote the first Round which passes from the *Occiput* round the Ear and Cheek, over the left Eye, and then over the Forehead *b* to its Beginning at the *Occiput*; *ccc* the circular Rounds about the Temples in which the Bandage terminates.

Fig. 11. Exhibits the *Monoculus* formed of a Handkerchief rolled up, and tied obliquely about the Head.

Fig. 12. Represents the *Binoculus* for investing both Eyes: applied by bringing the Bandage from the Forehead to the *Occiput* in the Direction *abc*, over the left Eye; and crossing on the *Occiput*, it then covers the right Eye in the Course *def*, returning to the *Occiput*, and is finally spent in the circular Turns *ggg* over both the Eyes.

Fig. 13. Shews the Method of applying the Sling for the Nose: *a* the Aperture in the Middle of the Bandage which intercepts the Orbiculus of the Nose; *bb* the two upper Heads which, being carried round the Temples and *Occiput*, are tied upon the Forehead *cc*, by the Knot *d*; *ee ff gg* denote the same with Respect to its two lower Heads.

Fig. 14. Exhibits the *single Bridle*, or Harness for the lower Jaw: *ab* the circular Turn about the Head, by which the Bandage begins to be applied; *b* the Place where the two Rounds, intersecting each other, are sewed together, and then passing under the Jaw in the Course *cde*, it is turned a few Times round the Chin and *Occiput fg*.

Fig. 15. Denotes the *double Bridle*: which is made with a two-headed Roller, whose Middle is first applied under the Chin, passing on each Side in the Direction *ab* to the Vertex of the Head *c*; the same Course is repeated several Times, and then it is passed round about the Neck and Chin, so as to invest the lower Jaw, upon the Middle of which its Heads cross at *e*, and being carried

carried to the *Occiput*, they pass from thence, and terminate circularly about the Temples and Forehead *ff b*.

Fig. 16. Exhibits the Sling with four Heads for the Chin; *a* the Foramen in its Middle, which intercepts the Chin: *bbbb* its four Heads or Ends.

Fig. 17. Represents the Manner in which the preceding Bandage is fixed upon the Chin and lower Jaw, and its Ends tied about the Head.

Fig. 18. Shews the Method of applying the Sling for the upper Lips: *a* its Middle which is not slit; *bb* its two upper Heads, which are tied upon the Forehead at *c*; *dd* its lower Heads, which, being carried up over the Cheeks *ee*, are crossed upon the *Occiput*, and then fastened by a Knot upon the Forehead.

Fig. 19. Shews the Mask for the Face: *ab* is the Mask itself which invests the Face, and is tied on by its six Heads or Ends *ccc ddd* upon the hinder Part of the Head.

Fig. 20. The dividing Bandage viewed on the fore Part of the Body: *aa* the circular Turns investing the Head, where it begins; *b, c*, the Turns which pass under the right and left Axilla to the Back, where the Roller-heads change Hands, and are then conveyed circularly about the Thorax *dd*.

Fig. 21. Represents a posterior View of the foresaid dividing Bandage: *a* the Place where the Roller heads traverse each other like an X; *bc* the Turns which go under each Axilla; *dd* the circular Rounds which invest the Thorax, and change their Courses upon the Back.

Fig. 22. Shews the contentive Bandage for Bleeding, &c. in the Neck. See Chap. III. Sect. II.

Fig. 23. Exhibits the *Capeline* for a Fracture or Luxation of the Clavicle, which is made with a double-headed Roller: *ab* the first Progress of its anterior Head; *cde* the circular Rounds about the Thorax made by its posterior Head, which, riding over the former, binds it down tight before it is reflected back in the Series *f g h*. See Chap. IV. Sect. I. N^o 1.

Fig. 24. Demonstrates the *Stellate Bandage* for the Clavicles and Scapulæ. It may begin under the Axilla *a*, and, forming its first Course *ab* over the left Shoulder, and under the same Axilla *c*, then traverses its said first Course at *e*, and, surpassing the right Shoulder *d*, passes again under the same Axilla at *a*, and so on as before: *e* denotes the Decussations of the Bandage, whence it has been denominated *Stellar*, from its imaginary Resemblance to the *radii* of a Star. You may also begin this Bandage above either of the Shoulders at *b* or *d*, as well as under either Axilla *a c*.

Fig. 25. Represents the *simple Spica* for injuries in or near the Shoulder and Axilla. The Middle of this Bandage is fixed under the sound Axilla *a*, and ascending crosses the Breast *b* and Back to *c*, its Heads there cross, and pass under the Axilla *d* of the affected Shoulder, upon which it rises, and is crossed again at *e*; then descending a-cross the Breast and Back to the opposite Axilla *a*, it is there crossed, and the same Course repeated as before. We have before described other Methods of applying this simple Spica at Sect. III. and IV. of Chap. IV.

S E C T. III.

Of the Bandages belonging to the Præcordia and Breasts.

X. The Bandage to be applied after the Amputation of a Breast must be six, seven, or eight Ells long, three or four Fingers broad, and rolled up with two Heads. You first fix its Middle under the Axilla of the sound Side A *Fig. 1. Tab. XXXVIII.* The two Heads are then crossed upon the Shoulder at B, from whence its anterior Head descends obliquely across the Breast C, and its posterior crosses the Back to the left Axilla D, (for we still here suppose the left Breast amputated, or else only a large Scirrhus extirpated from it) where its Roller-heads are crossed, and drawn tight upon the Compresses and Dressing on the Breast FE. Thence they ascend again in the Direction C, and crossing upon the right Shoulder B and Axilla A, then up again to B, so on several Times in the same Course as before; only observe to make your subsequent Crossings of the Bandage rather upon the Dressings EF, than under the Axilla D, for the greater Firmness and Security. And, lastly, when your Bandage is near spent, it must terminate by two or three circular Rounds about the Thorax, and upon the lower Part of the Dressings from A to D, fastening its Ends where they terminate by Pins or Suture. The Bandage called *Quadrige* or *Cataphracta*, may be used here very properly. This you will find described in the next Section, and delineated in *Plate XXXVIII. Fig. 4.*

The Bandage after taking off a Breast.

XI. To retain the Dressings in most of the common Disorders of the Breasts, the double T Bandage of HELIODORUS (*Tab. XXXVIII. Fig. 2.*) is generally used; which consists of two simple Bands or Slips of Linen, the one joined perpendicularly to the Center of the other in the Shape of a T, whence its Name. But its perpendicular Part is slit up almost to the End, which denominates it double, so that it forms a four-headed Bandage *aa* and *bb*, *Fig. 11.* or else two distinct Pieces may be sewed on at some Distance from each other, as in *Fig. 10.* like the Greek Π . The transverse Band *aa*, *Fig. 10.* and *11.* ought to be long enough to tie round the Body, and about two or three Inches broad. The direct or perpendicular Part of the Bandage ought also to be long, and broad enough to retain the Dressings, and pass over the Shoulders to tie behind the Back round the circular Band. The transverse Part of the Bandage is applied round the Thorax at the Bottom of the Breasts, *Fig. 2. aa.* so as to tie with a Knot upon the Back. After which the two slit Ends of the Bandage are carried up over the Dressings *c*, and on each Side of the Neck *d*, upon the two Shoulders *bb*. But there are some who apply the two Heads of the Bandage *bb* in a cross Manner over the Dressings, to retain them the more firmly, *i. e.* the right Head of the Bandage over the left Shoulder, and the left Head over the right Shoulder: in which Method they also apply the Bandage at *Fig. 11.* However, we find that the plain Method at *Fig. 2. c.* will very well answer the Purpose of Retention, and, by passing the two Heads *bb* on each Side the Neck, they are prevented from sliding to either Side off from the Shoulders:

Bandage for a disordered Breast.

ders : and then they may be also tied behind the Neck, without laying the Patient's Back naked, to fasten them to the lower Round of the Bandage ; by which last Method a weak Patient might be greatly injured from the cold Air.

Slings for
the Breasts.

XII. Considering the last mentioned Inconvenience of HELIODORUS's Bandage, and that it was but badly adapted for an ulcerated Cancer extending itself towards the Axilla ; in the Course of my Practice I endeavoured to contrive a kind of Sling with four Heads, more suitable and commodious for the Purpose, which I have since found to answer the good Intentions I first expected from it. The Length of this Bandage or Sling I made an Ell, or four Feet long, and about six Inches broad, leaving the Space of about a Foot in the Middle of the Bandage unsplit or entire. The Middle or entire Part of this Bandage, *Tab. XXXVIII. Fig. 3.* we applied to the Compresses and other Dressings upon the affected Breast, which we here suppose to be the left : the two upper Heads *bb* were then carried over the right Shoulder, and the lower *cc*, under the left Axilla towards the right Scapula on the Back, where they are now tied together by two Knots a little beneath the Letter *d*. And this is the Bandage which I have found much more easy and commodious, both for the Surgeon and Patient, than that of HELIODORUS, which last often molests the Patient to no small Degree, by fretting off the Skin about the Breasts and Thorax. Upon some slight Occasions may be used a Napkin or Handkerchief applied in this Manner, which will answer the Purpose tolerably well, and with very little Trouble, in the Manner we have directed for the Eyes, *Tab. XXXVII. Fig. 11.*

The Napkin
and Scapular-
lary.

XIII. We come now to a Bandage, whose Use and Application is very extensive and commodious, termed the *Napkin* and *Scapulary*. This is applicable in most Accidents, Disorders, and Operations inflicted on the Thorax, as Wounds, Ulcers, Fistulæ, Paracentesis, &c. of the Breast, Fractures of the *Spina dorsæ*, Sternum and Ribs, or Luxations of the last, &c. 'Tis composed of two Pieces of Linen, the first like a *Napkin*, of about an Ell long for Adults ; but for fat People it may extend to an Ell and a half, or more, and folded four or six Times together, so as to be about the Breadth of eight or ten Fingers, more or less according to particular Circumstances : which is then to be closely applied round the Dressings upon the affected Parts, and its two Ends sewed or pinned together upon the Breast, when the Disorder lies before, and upon the Back, when it is behind, as is shewn in *Tab. III. Fig. 1. B.* But to prevent this circular Band, or *Napkin*, from subsiding beneath the Part affected, and from off the Dressings, you must next proceed to apply the *Scapulary*, which is a Slip of Linen about three Feet long, and four or six Fingers breadth, with a long Slit in its Middle sufficient to let through the Head, as in *Tab. II. Fig. 9.* Its two Ends come down, the one over the Breast, and the other upon the Back, till they reach the circular Band or *Napkin* before and behind, to which they are now fastened by Pins or Suture, as in *Tab. III. Fig. 1. B.C.* This last Part of the Bandage derives its Name *Scapulary*, from a great Part of it resting on the *Scapulæ*, or Shoulder-blades. There are some, who prepare and apply this Slip of Linen for the Scapulary in a very different Manner, slitting it up at one End almost to the Middle, so as to make three Heads, the two anterior of which

which they place on each Side the Neck, and cross them upon the Sternum in Shape of an X, as in *Fig. 4. Tab. XXXVIII. f.* fastening them to the Napkin on each Side at the Thorax, as before.

S E C T. IV.

Of Bandages for the Sternum and Ribs.

XIV. In a Fracture of the Sternum, after the Reduction and Dressing with a glutinous Plaster, Compresses dipped in Spirit of Wine and Splints of stiff Pasteboard, you may, upon Occasion, apply the Napkin and Scapulary Bandage before described. But the Generality of Surgeons make use of a peculiar and stronger Bandage for this Purpose, which they call the *Quadriga*, or *Catapbraſta*, by which the Sternum and Thorax may be more close and firmly bound up. 'Tis made with a Bandage or double-headed Roller, about six Ells long, and three or four Fingers breadth, applied in the following Manner: First, the Middle of the Bandage is applied under either Axilla, suppose here the left, *Tab. XXXVIII. Fig. 4. a*, and its two Heads being carried upward, are crossed upon the Shoulder *b*, from whence they descend, one a-cross the Breast *c c*, and the other upon the Back, proceeding obliquely to the opposite Axilla *d*, under which being crossed, they then rise up, and cross on the right Shoulder *e*, as before on the left, after which the anterior Roller-head descends again obliquely a-cross the Breast to the left Axilla *a*, where it began. Which two Courses being completed, the Remainder of the Bandage is spent in the circular Turns *g*, about the lower Part of the Thorax, descending a little at each Turn, and decussating the Roller-heads of the Bandage each Time, either in the anterior or posterior Part of the Thorax, more firmly to invest the Sternum, in the Manner shewn by *Fig. 21. dd. Tab. XXXVII.* till the whole disordered Part of the Thorax is thus invested. This same kind of Bandage may be also applied after the Amputation of a cancerous Breast: in which great Care must be taken, so to place and tighten the Bandage on the Dressings, as to compress the Vessels, and prevent their Bleeding, which may be best effected by making the Roller-heads change Hands, and cross each other upon the affected Breast, at every Round above the first.

XV. With Regard to Fractures and Luxations of the *Ribs* and *Spina dorsi*, after they have been properly reduced, and secured by Compresses, dipped in warm *Sp. Vini*, and with thick Splints of Pasteboard, your Deligation may be completed as at *Sect. XII. and XIII.* preceding.

Bandage for
the Ribs
and Spine.

C H A P. V.

Of Bandages proper to the Abdomen and private Parts.

1. **T**HE most usual Deligation for the Abdomen, after the Infliction of Wounds, or the Operations of *Gastroraphia*, *Paracentesis*, &c. is, by our modern Surgeons, at present made with the Napkin and Scapulary, described

The Napkin
and Scapu-
lary.

in Sect. XII. of the preceding Chapter, and exhibited in *Tab. III. Fig. 1. B C.* Which Bandage is very equal to its Intentions, only the Scapulary must here be longer for the Abdomen than it was for the Thorax, as every one must imagine from the Make of the Body.

Circular
Bandage of
the Abdo-
men.

II. The Ancients, and even at present some of the Moderns, apply a simple Bandage in the abovementioned Cases of the Abdomen; which, being about six Ells long, four Fingers breadth, and rolled up either with one or two Heads, is then applied upon the upper Part of the Abdomen, and continued by two or three circular Turns about the same, after which it descends spirally, till the Parts affected and their Dressings are well covered and secured: and then securing its Termination either by Pins or Suture, you are to fasten it to a Scapulary, to prevent its subsiding. The *Quadriga, Tab. XXXVIII. Fig. 4.* may be also applied with Advantage for Deligations in Disorders of the Abdomen; with this Difference, that, after making the Turns *a, b, c, d, e, f,* the Course *g* must be continued either circularly, or spirally over the injured Parts of the Abdomen: so there is here no need of the Scapulary, since the circular Turns of the Bandage *g,* are sustained by the Parts *a, d.*

Uniting
Bandage of
the Abdo-
men.

III. Longitudinal Wounds of the Abdomen, which are not very large, may usually be successfully united and healed without *Gastrophagia*, or the Suture, barely by the *uniting Bandage*, as we have declared in treating of Wounds in the Abdomen: which Bandage must be about four Ells long, and four Fingers breadth. In the Middle of it is made a Slit about four Fingers breadth long, and the Ends of the Bandage are then rolled up in two Heads, *Tab. V. Fig. 8.* And the Method of applying it, I think, may be easily learned from what we have said more at large on the uniting Bandage of the Forehead, *Chap. II. Sect. IV. Tab. XXXVII. Fig. 3.* For, the Slit or middle Part of the Bandage being laid over the Wound, the other Head of the Roller is carried round the Abdomen, and then passed through the said Slit, and drawing the two Heads tight, the Lips of the Wound are thereby approximated, or joined close together. Then the Roller-heads, being carried back to the *Vertebræ* or Spine, are crossed there, and brought round again to the Wound, where the two Heads decussate each other, to constringe and approximate the Lips: in which Manner the Bandage is to be continued till it is spent, and then fastened either by Pins or Suture.

Bandage for
the Ompha-
locele.

IV. For the *Hernia umbilicalis*, take a leathern Belt armed with a Compress either round, (as in *Tab. XXIV. Fig. 6. A.*) or square, (as in *Tab. XXXVIII. Fig. 5.*) which Compress or Button is to be placed over the Navel, after a Reduction of the *Hernia*, and the Belt *B B* then fastened round the Abdomen, either by the Buckle *C.* (*Tab. XXIV. Fig. 6.*) or otherwise. But lest the Belt *B B.* *Tab. XXXVIII. Fig. 5.* should subside, or fall down lower than the Part affected, you must connect it both before and behind to the Scapulary *C,* made of strong Linen: and to prevent it from sliding upwards, a Piece of Linen or Callico is to be fastened under the Compress *A,* which, being brought round the Nates on each Side the Scrotum, is carried up, and fastened to the Sides of the Belt *B B,* by Strings or otherwise.

The T Ban-
dage for the
Scrotum,
&c.

V. For *Fistulæ* and Abscesses of the *Anus* and *Perinæum*, a Fracture of the *Os sacrum*, a Luxation of the *Os coccyx*, after cutting for the Stone, &c. we generally apply the T Bandage of *HELIODORUS*, as it is denominated from its

Figure

Figure and Inventor. See *Tab. II. Fig. b.* and *Tab. XXXVIII. Fig. 10.* and *11.* The proper Dressings being held upon the affected Parts, the transverse End of the Bandage *aa*, *Fig. 14.* is applied round the Abdomen, with its perpendicular Part coming down upon the *Os sacrum b*, and betwixt the Thighs *dd*, up to the circular or transverse Part of the Bandage upon the Abdomen, to which transverse Part they are fastened by a Knot on each Side near the Groins. This T Bandage is also convenient for the *Hydrocele*, *Sarcocoele*, and other Tumors of the Scrotum and Groins, with Inflammations of the Testicles, &c. where, however, the transverse Part of the Bandage *aa* *Fig. 7, 8, 12.* must be applied so, that the perpendicular Part *bb*, (*Fig. 6, 7, 8, 9, 10, 11, 12.*) may invest and retain the Dressings upon the Parts affected. In many Cases it will be necessary to use the Scapulary without the Napkin, for the greater Firmness and Security of this Bandage. And, lastly, you may observe, that the Figure of the T Bandage varies according to particular Uses: That of *Fig. 6.* is adapted for the Inguen, as at *Fig. 7.* That of *Fig. 9.* is accommodated to the Scrotum, as in *Fig. 8.* That at *Fig. 10.* and *11.* is fitted for Disorder of the Breasts, Anus, Scrotum, and Perinæum: and that at *Fig. 13.* is restrained chiefly to Tumors of the Scrotum, as the *Sarcocoele*, *Hydrocele*, &c. being therefore termed *La Bourse*, or Sacculus for the Scrotum.

VI. We are furnished with a new kind of Bandage contrived purposely by Monsieur ARNAUD of *Paris*, for *Fistulæ* and Abscesses of the Anus, which M. GARENGEOT^a thinks to be admirably well adapted for those Uses, and describes its Application in the following Manner: First, a Scapulary (*Tab. III. Fig. 1. c.*) long enough to reach the Abdomen, is applied with the Napkin B about the Body, as we before directed in *Chap. IV. Sect. XII.* Then three or four Strings of Tape are sewed near the Juncture of the Napkin and Scapulary with each other upon the Back, *i. e.* in the Interstice *aa*, *Fig. 14. Tab. XXXVIII.* He then takes another Band above an Ell long, and five or six Fingers breadth, which he slits up in a right Line, so as to leave not above two Hands breadth entire at one End, like the Part *b* in the last mentioned Figure. Again, there are three or four more Strings or Tapes fastened at the Margin of the Part *cc*, which are to tie with the other Strings of the Napkin in *aa*, by single Knots: by drawing which, he says, the Patient may take off and renew the Bandage at pleasure without any manner of Trouble or Uneasiness^b. When the Fistula has been dressed with Tents, Lint, and Compresses, the fore-mentioned Strings at the Ends of the Bandage, are to be tied with each other in Knots upon the Back at *aa* and *cc*: which done, the two slit Ends *dd* are passed over the Anus betwixt the Thighs, so as to rise up and join with the Napkin, the one on the right Side of the Abdomen, and the other on the left. And, lastly, if there be a profuse Bleeding after the Incision, as is sometimes the Case, an Assistant is then forcibly to compress the Parts with his Hand for an Hour or two. The Excellency of this Bandage, according to M. GARENGEOT, consists

ARNAUD'S
Bandage for
the Anus.

^a In his Chapter on *Abscesses of the Anus*; but in the second Edition of his Operations he says nothing of its Inventor.

^b But what is to be done with the two narrow Ends of the slit Bandage, M. GARENGEOT does not tell us, though without doubt they must be joined with the anterior Part of the Napkin, like the T Bandage, or else the Strings would be of no Use.

in its being held firm, and closely compressing the affected Parts by means of the Scapulary upon the Shoulders, which is the Fulcrum of the Bandage. But I also think the common T Bandage, *Fig. 11.* has the same Advantages, provided the Scapulary be made strong; and especially if the whole Bandage, or at least its transverse Part be made of Ticking for Strength.

The knotted
Bandage for
the Peri-
næum.

VII. There are few or none of the preceding Bandages capable of restraining a profuse Hæmorrhage after cutting for a Fistula of the *Anus*, or for the Stone. Nor do I find any proposed for these Purposes by Writers in their Books of Surgery and Bandages, notwithstanding the Instances of Patients lost by such profuse Bleeding after those Operations. I therefore thought it would be of some Consequence to contrive one more effectual for such Purposes, than any we are yet acquainted with, which, in my Opinion, proves to be the following. Take a Bandage or slip of Linen six, eight, or even ten Ells long, and three Fingers breadth, rolled up with two Heads. After the Wound has been dressed with Dossils of Lint, and thick Compresses dipped in *Alcohol Vini*, as in other Hæmorrhages, apply the Middle of your Roller over the Perinæum, from thence bringing up its anterior Head through the left Inguen (*a b Tab. XXXVIII. Fig. 15.*) a-cross the corresponding *Os ileum b*, and the posterior Roller-head ascending betwixt the Nates of the same Place, the Heads are then drawn tight, crossed or decussated, and then the anterior Head carried forward a-cross the Abdomen *d*, and the posterior directly a-cross the Back or Loins to the right *Ileum e*. Here, decussating each other again, the anterior Head is brought down over the right Inguen *f, g*, and the posterior descends over the right Buttock to the Perinæum, where the two Roller-heads change Hands so as to form a kind of Knot, in the same Manner as the knotted Bandage for Arteriotomy in the Temples (*Tab. XXXVII. Fig. 7.*) The Roller-heads being thus contorted, and drawn tight, do then again ascend, the one over the left Inguen, *a, b*; and the other betwixt the Nates to *c*, continuing in the same Course as before, always observing to fix your Knots or Decussations between the Thighs behind, and advancing upon the Incision of the Perinæum in cutting for the Stone, and upon the Anus after Syringotomy, or cutting the Fistula. And this is the proposed Bandage, which may be called knotted for the Perinæum, as it very closely invests and compresses that Part. If it be thought necessary to make the Bandage still stricter upon the Parts, after the first Round or Course over each Inguen, as before, and drawing the Knot tight upon the Perinæum, the anterior Roller-head may be carried up obliquely from the left Inguen *a*, over the Abdomen and right Shoulder in the Course of the dotted Line *b*, and the posterior Head being carried up a-cross the Back to the same Shoulder, the two Heads are there crossed or decussated, and then brought down again in the same Course to the Perinæum, where they are to form a Knot as before, the better to compress the bleeding Vessels. Then they are carried up in the same Manner from the right Inguen, *g, d, i*, to the left Shoulder, there decussated, brought down, and formed in a Knot on the Perinæum, as before. And, lastly, those Turns which only ascend from the Perinæum to the Hips, are to be continued circularly about the Body, as long as the Bandage lasts, for the greater Firmness and Security of the whole. But when you cross it over the Shoulders, in the last described Method, your Roller ought to be at least eight Ells long, to allow for those large Turns.

VIII. We

VIII. We have a particular Kind of Bandage, termed *Spica inguinalis*, which is applied after intestinal Ruptures, the Operation for the *Bubonocoele incarcerata*, a Luxation of the Femur, and a Fracture of the *Os ileum*. This may be applied after several Methods like the *Spica* for the Shoulder before described; and, like that, it may be made either with a single or double-headed Roller. The single-headed Roller must be four Ells long, and three Fingers breadth. Its End being fixed upon the *Ileum* of the sound Side, (*Tab. XXXVIII. Fig. 16. a*) the Roller-head is passed round the Bottom of the Abdomen *b b*, and from the other Hip *c*, it passes round the Back-part of the Thigh, comes up between the Thighs at *d*, and passes over the Compress on the Inguen *e*: and from the Hip *c*, after crossing it goes round the Back to its Beginning at *a*; which Course is to be again repeated as long as the Bandage will permit, or the Surgeon shall see necessary. Or after the first Course has been thrice repeated, the Remainder may be spent circularly about the Abdomen, to bind down and secure the others. But after the Operation has been performed for the *Hernia incarcerata* when you have thrice repeated the first Course, you may then fasten the Bandage with a Pin in the left Inguen; and bringing it up under the Scrotum *f*, over the tight Inguen *g*, you may fasten it in the same Manner to the circular Rounds at *b*. Then making it descend again from *b* under the Scrotum *f*, it may be brought up again to the left Inguen *d e*, and there pinned as before: which Course may be repeated at Discretion, in order to retain the Dressings. When this Bandage is thus applied but to one Side, it is termed the *Spica inguinalis simplex*.

IX. The simple *Spica inguinalis* may be also commodiously applied with a two-headed Roller, about five Ells long, and three Fingers broad. The Middle of which is to be fixed, like the former, upon the right Hip *a*, *Fig. 16.* and the two Heads brought round the other Hip *c*, where, being crossed, they are then carried down to the Perinæum *d*, where they are crossed again, and then brought up to the Hip *c*; thence round the Body to the other Hip *a*, and so on till the Roller terminates. But in a Luxation of the *Os femoris*, or a Fracture of its Neck, it will be expedient to make some circular Courses round the upper Part of the Femur, when the Roller is near spent, to strengthen the Bandage and secure the Bones. Or you may apply this double-headed Roller, by fixing its Middle in the Perinæum at *d*; from whence bringing up the two Heads obliquely to the Hip *c*, they there cross, and pass round the Body to the other Hip *a*, repeating the same Course till the Bandage is spent, when its Extremity may be fastened where it terminates by a Pin.

X. When the *Spica* Bandage is thus applied on each Side for a Disorder in both the Groins, it is then termed the *double Spica inguinalis*, for which the Roller must be six Ells long, three Fingers broad, and rolled up with two Heads. The Middle of the Bandage is here usually applied to the Back upon the Loins, and coming round the Body to the anterior Part of the Abdomen, the Heads are there crossed, and, descending on each Side the Scrotum, they go backward and round each of the Nates to the adjacent Inguen on each Side. Then passing over the Inguen upon the Dressings, they proceed backwards and upwards to their Origin at the Loins, where the Heads being crossed, are brought round, and descending over each Inguen, the preceding Course is repeated as before.

before, and so on till the Bandage being spent, its End is fastened where it terminates. You may also observe, that this Bandage may be applied in the Course, which we described in *Seet. VII.* supposing you omit the Knots, or crossing upon the Perinæum. And here, applying the Middle of the Bandage between the Thighs (*Tab. XXXVIII. Fig. 15. a*) the two Heads ascend in the Direction *b*, to the Hip *c*, where, crossing, they go round the Body to the other Hip *e*, and from thence down by *f*, *g*, under the Perinæum, where the Roller-heads change Hands, or cross, and return in the same Course *f*, *g*, to the Hip *e*, and from thence round the Body to the other Hip *c*, and then over the left Inguen to its Origin at the Perinæum: which Course must be repeated till the Bandage is spent, and its End fastened where it terminates. The *double Spica inguinalis* may be used for a Luxation of both the Thigh-bones, or in a Fracture of their Necks, as also after the Operation for Ruptures on both Sides.

Bandage for
Bubos.

XI. The common Bandage for Bubos, and other Tumors in the Groins, is usually the T Bandage of HELIODORUS, described at *Seet. V.* preceding; or the Bandage at *Fig. 6. Tab. XXXVIII.* applied like the T Bandage. But as one of its transverse Heads *aa* is short, it must be placed so upon the Body as to tie on one Side, as in *Fig. 7. c*, that the Patient may unloose, and fasten the same at pleasure. The largest, and perpendicular Part *b*, descends over the Groin, under the Perinæum, and over the Buttock, to the Back-part of the transver End *aa*, upon the Loins on one Side. We have in the Table now mentioned only represented this Bandage for one, *viz.* the left Inguen: but the very same being turned on the other Side, will also serve for the right Inguen, upon which it must be applied as before on the left.

Bandages for
the Scro-
tum.

First.

XII. The Application of Bandages to the Scrotum is very frequent, not only to retain Cataplasms, and other topical Remedies for an Inflammation, &c. of this Part, or of the Testes, but also for the crural Rupture, where a just Administration of the Bandage proves the chief Remedy. There are three Kinds of Bandage applied by Surgeons to this Part. The First, and most handy of which is the T Bandage of HELIODORUS before described at *Seet. V.* having the upper End of its perpendicular Part of about two Hands breadth, and perforated, to transmit the Penis, as in *Tab. XXXVIII. Fig. 9. c.* the Extremity being slit up for about two Spans, so as to make the two Heads *bb*. After the transverse Part *aa* has been applied round the Body, the Penis then transmitted through the Aperture *c*, and the two Slips *bb* decussating each other upon the Perinæum, the Scrotum and its Dressings are, by that means, pretty closely invested and well retained, supposing the two Slips *bb* to be fastened upon the Hip on each Side, as at *Fig. 8. c.* Sometimes the Scrotum is invested (2.) with a kind of Sling with four Heads, about an Ell long, and six Fingers broad, slit up at each End, so as to leave about two Hands breadth entire in its Middle; which may be conveniently enough applied to retain Compresses and other Remedies to this Part. 'Tis applied by fixing its entire or middle Part upon the Scrotum, and betwixt its two anterior Heads, near the entire Part, you let through the Penis, and, carrying the Heads round the Body, tie them in a Knot upon the Loins: while the two inferior or posterior Heads are passed under the Perinæum, and, crossing each other, are brought forwards over the Nates,

Second.

tes, that of the right Side to the left Inguen, and that of the left to the right Inguen, as in *Fig. 12.* tying them in a Knot. Notwithstanding these mentioned Bandages are very sufficient and convenient for most Dressings and Disorders of the Scrotum, we are yet provided with another, which is by the *French* denominated *la Bourse*, or the Purse, from its Resemblance to that Receptacle; concerning which we have already spoke at Sect. V. preceding. 'Tis to be made of strong Linen, with four Heads, and suitable Strings, as in *Tab. XXXVIII. Fig. 13.* where AA denote the Purse for the Scrotum; BB the two Swaths, which, being placed round the Body, are tied together by the Strings *ab.* The Aperture *c* transmits the Penis: and the two lower Heads of the Bandage DD are carried betwixt the Thighs, so as to pass round the Nates, and be fastened by the Strings EE upon each Hip, by passing them through the eylet Holes *dd*; by which Means they become duly fastened to the upper Part of the Bandage BB. This last Bandage is also generally denominated the Suspensor of the Scrotum.

XIII. The several Swaths and Bandages for Ruptures, you may see figured and described at *Tab. XXV.* foregoing.

XIV. The little Bandage to be applied upon the Penis in Case of Wounds, Abscesses, Phlebotomy, a Phimosis, and other Disorders of that Part, must be about an Ell long, and an Inch broad; having a Slit or Aperture at one End, of an Inch long, and its other End slit up for about two Hands breadth. See *Tab. II. Fig. e.* 'Tis applied by passing the Slit-end through the Aperture in the other, so as to form a Loop or Noose, which is drawn tight upon the Penis and its Dressings: and, after winding round the Remainder of the Bandage moderately tight upon the affected Parts, till you come to the Slit-ends; these last are also to be passed once or twice round in opposite Directions, and then fastened by tying in a Knot. For Abscesses, and other Disorders of the *Glans* and *Præputium*, it is most convenient to apply a Compress and Plaster, cut in the Shape of a *Malta* Cross, making a small Aperture in their Middle for emitting the Urine: these being sizeable to the Part, and the other Dressings they are to retain, should be first applied before the preceding Bandage, by which they are to be secured. And, lastly, in Case of a preternatural Rigidity and Inflammation of the Penis, which often happen in a Priapism, Paraphimosis, and Gonorrhea, it may not be amiss to follow the Direction of those, who advise the Penis to be placed in a Kind of oblong Linen-bag, answerable in Size and Figure to the Part, upon which it may be retained by two long Strings, fastened about the Waist, or upon the Groin.

Bandage for the Penis.

C H A P. VI.

Of Bandages for the Arm and Hand.

I. **W**E have hitherto described the Bandages proper to the Trunk in its several Districts of the Head, Neck, Thorax, and Abdomen. We shall now therefore treat of those belonging to the Limbs and Extremities of the Body, whether upper or lower, beginning with that for a Fracture of the Os

Bandage for a fractured Humerus.

Humeri. When the Fracture has been properly reduced, and secured with a large Compress (*Tab. II. Fig. 18.*) expressed out of warm Wine or *Oxycrate*, your Bandage, to be then applied, must be about six Ells long, three Fingers broad, and rolled up with one Head, which is to begin by two or three circular Rounds upon the fractured Part, and then gradually to ascend in spiral Revolutions or *Doloires* to the Shoulder: then, after making a Course about the Thorax, and under the sound Axilla (which is often omitted) the Roller returns to the affected Shoulder, and, gradually descending by *Doloires* in the like spiral Course, it at length forms three circular Rounds again upon the Fracture itself. Before the Roller is applied, it should be moistened with warm Wine, its Spirit, or *Oxycrate*, in order to make it adhere the more firmly upon the Part. The Bandage at last descending to the Bottom of the Humerus in a spiral Course, it then forms two or three spiral Turns upon the upper Part of the Cubitus below its Flexure, but so as to leave the *Olecranon*, or Elbow, disengaged, and free for Motion; by which Course the Bandage will adhere more firmly to the Part. This done, in the next Place, you lay four Compresses longitudinally, according to the Course of the Arm, which are to be about six or eight Fingers breadth long, and two broad, for Children, but three for Adults, disposed upon the Fracture equi-distantly, and previously moistened with a little warm Wine, or *Oxycrate*. Then the remaining Part of your Bandage is carried up spirally over the Compresses from the Cubitus to the Fracture of the Humerus, where, making two or three circular Rounds, it ascends spirally to the Shoulder. If any Part of the Roller still remains after the Compresses have been well covered, it again descends by spiral, but more distant Turns upon the Arm, till at last its End is fastened, where it terminates by a Pin. In the next Place, the Surgeon generally applies three or four Splints^a of about a Span long, and two Fingers broad, made commonly of stiff Pasteboard, or Slips of thin Deal glued on Leather, but sometimes of thin Steel or Brass, which are applied longitudinally like the Compresses, according to the Length of the fractured Arm, as at *aaa*, *Fig. 17. Tab. XXXVIII.* Which Splints are again retained by three Tapes of about two Feet, or half an Ell long, tied firmly upon the Part, beginning with the middle one first, before you tie on either of those at the Ends; always observing to make your Knots even, and upon the external Part of the Arm, for the greater Neatness and Conveniency of tying, and untying them. See *Tab. XXXVIII. Fig. 17. bbb.*

Treatment
after the
Deligation.

When the Deligation has been in this Manner compleated, the Arm is then to be suspended in a Sling or Scarf about the Neck in an angular or bent Posture, so that the Hand may come over the *Scrobiculum cordis*^b. In an oblique Fracture of the Humerus it may be convenient, to let the Weight of the Arm be less supported by this Sling, in order to prevent the lower Fragment from riding over, or above the upper one: but in a transverse Fracture the Sling should be shorter. The Sling for this Use may be commo-

^a There are indeed some (as M. PETIT *Lib. de Morb. Off.* Tom. II. pag. 34.) who reject the Splints as useless in Fractures, judging the Compresses alone to be very sufficient, as I am sensible they often are. But the Generality of Surgeons have, notwithstanding, retained the Use of Splints, for the greater Firmness and Security of the reduced Fracture.

^b This CELSUS, *Lib. 8.* has long ago taught: 'That a Sling is to be made about the Neck with a Napkin folded together, into which the Arm is to be placed as at *Fig. 17.*

diously made of a large Napkin folded together, so that being tied about the Neck by its two Corners in the Knot *d*, upon the sound Shoulder, the Arm may be sustained by the Middle of it *c c c c*. When the Patient's Circumstances are answerable, this Sling may be made of black Silk instead of a Napkin. Instead of one long Roller for the Fracture of the Humerus, there are some Surgeons, who use three shorter ones: of which they make the first an Ell and an half, the second two Ells, and the third two Ells and an half long. The first is spent in ascending Turns, the second in descending ones, and the last is employed upon the Compresses and the Fracture itself: which is a Practice that will very well answer the End for which it is designed by the Operator. Some again apply the Splints immediately upon the Compresses, and spend the third Bandage, or the last Part of the long Roller in retaining them upon the Part; which is a Method, in my Opinion, equally good with the first. It is to be observed as a Caution, that, without some extraordinary Accident, you should never take off the first or outermost Bandage before the fourth or fifth Day, when it is well adapted; nor the second, before the eighth Day; nor the third, or innermost, before the twelfth Day, when the Fragments of the Bone may be supposed firmly conjoined: the firm Union of which we generally find by Experience accomplished in this Bone, within the Space of forty Days from its Reduction.

After the third Renewal of the Bandage, the Arm is to be moved a little, or gently bent, and extended a little at the Juncture of the Elbow, in order to prevent an *Anchylosis*, or Stiffness of the Joint. If the Limb should have already contracted some Degree of this Disorder, the best Method of restoring its Mobility is, by frequent Motion of the Joint, with the Application of emollient Ointments, Fomentations, or Cataplasms, as also to let the Patient swing around a Weight every Day in his Hand. 'Tis also of no small Service in this Disorder, to thrust and continue the Arm for some Time in the Belly of an Animal just killed. But for the Use of Spirits and Astringents in this Case, which are sometimes ordered by imprudent Surgeons, they are highly pernicious.

How to prevent an Anchylosis.

When the *Os humeri* is fractured in its Neck, or near the Shoulder, the Patient is then in a dangerous Case, and the preceding Bandage will very often be of little or no Service. It may therefore here be proper to apply the simple *Spica*, which we before recommended for a Fracture of the Clavicle in Chap. IV. Sect. I. preceding; only observing, in this Case, to make the Deligation, or Turns of the Bandage about the Shoulder, more exact and firm, as being the Part here immediately concerned. M. PETIT also thinks, that the eighteen-headed Bandage, *Tab. IX. Fig. 4.* may be properly used for this Fracture. But I cannot see how that Bandage will be sufficient to retain the fractured Parts.

When the Fracture is near the Humerus.

II. For a Fracture of the lower Arm or *Cubitus*, after a Reduction of the Bones according to our Directions given for Fractures, you are, in the first Place, to apply a Piece of Linen-cloth of a Span's length and a Hand's breadth, slit on each Side as we described for a Fracture of the *Humerus*, *Tab. II. Fig. 18.* which, being dipt in *Sp. Vini*, or *Oxyerate*, its Heads, or slit Parts, are to be closely applied round the Fracture. Then you are to take two thick Compresses, almost the Length of the *Ulna*, and apply one on the Inside, and the other

Bandage for a fractured Cubitus.

on the Outside of the Cubitus, over which again you must fix Splints of Wood or Pasteboard of a convenient Size: though M. P E T I T thinks the Use of Splints unnecessary here. For your Bandage, that must be a single-headed Roller of about an Ell and half long, and three Fingers broad, which is to invest the Splints, or Compresses without the Splints, first, by making two or three circular Rounds upon the Fracture, and then ascending by spiral Doloires or Turns above the Cubitus and Elbow, where two or three circular Rounds must be made before the Band terminates. Then you take another Band, and, fastening it by two or three circular Turns upon Termination of the former, it then gradually descends by spiral Turns to the Hand, and, taking in the Thumb by it as in a Loop, you draw it back, or extend it towards the Carpus, upon which, after two or three circular Turns, its End is fastened by a Pin. Then you are to place two Splints of thick Pasteboard, the one without, and the other within-side the Cubitus, which Splints must be almost as long as the *Ulna*, and broad enough to invest the Part, dipping them first in Spirit of Wine, or *Oxy-crate*, to render them pliable, and to fit close to the Limb, upon which they are to be retained by a Bandage two Ells long, and near three Fingers broad, to be applied first by making two or three circular Rounds about the Middle of the Cubitus, and then ascending spirally to the Elbow; then descending in the same Manner, the End is to be fastened where it terminates by a Pin or Suture. Yet there is no great Obstacle against your retaining the Splints by three or four Tapes, as we have represented in *Tab. XXXVIII. Fig. 17. bbb* for the *Humerus*. And there are some Surgeons, who use but one Pasteboard Splint, in which they place the Arm as in a Trough. See the Figure of it in *Tab. VIII. Fig. 14*. The Method of applying it is in *Tab. XXXVIII. Fig. 17. ee*. When every thing has been adapted in this Manner, the Arm is to be constantly suspended in a Napkin or Sling about the Neck, denoted by *cccc* in the last cited Figure. For the rest, you may observe what has been said at Sect. II. & *seq.* for a Fracture of the *Humerus*. And thus a Fracture of the Cubitus, or lower Arm, will usually obtain a perfect Cure within the Space of a Month or thirty Days.

Bandage for
a Fracture
of the Car-
pus.

III. For a Fracture of any of the Bones in the Carpus, after the Fragments have been adequately reduced, the following Bandage is to be applied. First, you take a single-headed Roller five or six Ells long, and two Fingers broad, with which you make three circular Rounds about the injured Carpus, passing it soon after betwixt the Thumb and Fore-finger, and then roll it thrice round the Carpus again, so as to make the Bandage intersect itself upon the Back of the Hand like an X. This done, the Roller-head is then carried up spirally from the Carpus towards the Cubitus, and at last passes above the Junction of the Elbow: then, after fixing a Compress on the out and inside of the Carpus corresponding to its Breadth, the Bandage descends again spirally to the Hand, in order to make an exact Retention of the Compresses. Lastly, over the Compresses are placed two Pasteboard Splints, which are bound on very exactly by the Remainder of the Bandage: and the Arm is then suspended in a Sling or Napkin about the Neck, as at *Fig. 17*.

Bandage for
the Meta-
carpus.

IV. When the fractured Parts of any of the metacarpal Bones have been adequately reduced, the Bandage, before ordered for the Carpus, is to be applied by making, first, three circular Rounds above the injured Part of the Hand:
and

and then, passing it betwixt the Thumb and Fore-finger round the Ball of the former, it is carried round the Carpus, after which it returns to its former Course about the Metacarpus, by crossing over the Back of the Hand like an X. When this Course has been thrice repeated, and the Bandage carried a few Times round the Metacarpus, it then gradually ascends by spiral Turns above the Cubitus, or Elbow, as we said before at Sect. III. And, lastly, two Compresses and Pasteboard Splints are placed, the one on the Palm, and the other on the Back of the Hand, in which Position they are closely retained by the Remainder of the Bandage. See the Figure of the Splint in *Tab. XXXVI. Fig. 5.*

V. For a Dislocation of the Cubitus, after an adequate Reduction, as we have directed in our Book of Luxations, a Linen-cloth cut, as in *Tab. II. Fig. 18.* is to be first dipt in *Sp. Vini*, or *Oxycrate*, and then exactly applied round the Elbow, or Juncture of the Cubitus. You then take a single-headed Roller about five Ells long, and two Fingers broad, with which you make two circular Rounds above the Flexure of the Cubit, from thence descending obliquely a-cross its Flexure, as in the Bandage after Bleeding. It then forms two circular Rounds upon the Cubit below the Elbow: and, ascending again obliquely over the Flexure, and up by the Inside of the Arm, it, by that Means, crosses the former Course in shape of an X; and, having made two more circular Rounds about the lower Head of the Humerus, it is then carried down below the Elbow. This Bandage therefore forms a sort of Figure of 8, the one half above, and the other half below the Elbow. There are indeed some Surgeons, who think this long and complicated Bandage unnecessary for a Luxation of the Elbow, as the Intention may be as effectually answered by a simple spiral Bandage continued up and down the Arm; moistening the Roller with some of the forementioned Liquors, to suppress or prevent a Tumor and Inflammation of the Parts. And, lastly, the Arm, being thus dressed, is to be suspended by a Sling about the Neck, as before: but then Care should be now and then taken gently to bend and extend the Arm, to prevent a Stiffness of the Joint.

Bandage for
a Luxation
of the Cubi-
tus.

VI. For a Luxation of the Carpus, after Extension and Reduction, you take the preceding Bandage; and, passing it thrice round the affected Part, it is then carried betwixt the Thumb and Fore-finger, going backward round the Ball of the Thumb, and crossing the former Turn on the Back of the Hand like an X, and then it passes circularly about the Carpus. This Course, being several Times repeated, you are then to bind a stiff Pasteboard Splint on the fore and back Part of the Carpus, and a large Ball is to be placed in the Hand, in order to extend the Fingers: all which are to be properly secured by the rest of the Bandage, which is at last to terminate by spiral Turns above the Cubitus, to prevent Tumor and Inflammation.

Bandage for
a Luxation
of the Car-
pus.

VII. Among other Bandages of the Arm, we shall here briefly describe that for compressing the Orifice of an incised Vein, after bleeding in this Part. This is to be about an Ell, or Ell and half long, and near two Fingers broad; and is, in my Opinion, best applied by fixing its End upon the square Compress, covering the Orifice so as to let about a Span of it hang down above the Outside of the Flexure of the Cubitus. Then carrying the other Part of your Bandage from the Compress obliquely down, and over the Inner-side of the Arm, and making

Bandage for
Bleeding in
the Arms.

a Round below the Flexure of the Elbow, it ascends again obliquely from the Outside over the Compress, and round above the Elbow like a Figure of 8, the X or crossing, coming in the Middle of the Flexure of the Arm. This last Course of the Figure of 8 you are to repeat as long as the Bandage will permit, saving enough to tie with the other End in a Knot above the Elbow on the Outside of the Cubitus, as in *Tab. III. Fig. 1. D.* If little Strings of a Span long are fastened to each End of this Bandage, as we frequently do in *Germany*, it may then be very neatly applied, as those Strings make but a very small Knot: and then the broad Part of the Bandage need not exceed an Ell in Length, and its Application may be performed exactly in the same Manner.

Bandage for
a Puncture
of the Arter-
y in Bleed-
ing.

VIII. If the Surgeon should either, by Accident or Imprudence, having incised the Artery in opening the Vein of the Arm, after letting the Patient bleed *ad deliquium*; (see Part II. Sect. I. Chap. XII.) he must apply two or three thick Compresses, in one of which must be included a Farthing or Half-penny, to make the greater Pressure and Resistance upon the wounded Artery. Then you must take a single-headed Roller, five or six Ells long, and two Fingers broad, and making first two or three Rounds above the Elbow, you then conduct the Roller as after Phlebotomy at Sect. VII. but drawing the Bandage a little tighter here for the Artery, than for the Vein. After five or six Rounds about the Arm and Elbow in that Manner like a Figure of 8, apply a long and narrow Compress, extending on the Inside of the Arm from the Flexure of the Cubitus to the Axilla, so as to be incumbent as exactly as possible upon the Brachial Artery. Your Roller must then ascend gradually by pretty tight spiral Rounds upon the Arm up to the Top of the Shoulder, in order to stop and diminish the Quantity of Blood coming to the Wound by that Trunk of the Artery. Which done, your Roller then is carried obliquely from that Shoulder a-cross the Breast, and under the opposite Axilla, and, coming round again to the Shoulder of the injured Arm, it then descends spirally upon the Arm in an opposite Course to the preceding, fastening the End of your Roller securely wherever it terminates. If a Bandage of the forementioned Length is not at hand, any one that you have, which is shorter, may be fastened about the Wound, and the brachial Artery, which may even be held and compressed by the Fingers of an Assistant, till you can procure a longer Bandage: for to delay any considerable Time in providing a longer Bandage without this Precaution, would expose the Patient to a dangerous Hæmorrhage, and more fatal Symptoms. For nothing can hinder you from applying your long Bandage over the shorter, with the necessary Compresses, as we have now directed, when you have them in Readiness. When the Deligation is compleated, the Arm is to be suspended in a Sling about the Neck, as in *Tab. XXXVIII. Fig. 17.* but without the PASTEBOARD Case *ee.* In the mean Time the Patient must be ordered to abstain from Commotions both of Body and Mind, and also to refrain from an heating Diet, and spirituous or fermented Liquors: and for the rest, you may consult our Chapter professedly on the Accident before-cited.

Bandage for
an Aneur-
ism.

IX. Nor is the preceding Bandage confined to Punctures of the Artery only but it may be also applied with equal Advantage for small Aneurisms, which do not require the Operation with a Scalpel and Tourniquet. In which Case
the

the first Step is to return the extravasated Blood again into the Artery, by Pressure with the Finger or Thumb: after which you must apply over the Part that was distended, first, a bit of astringent Plaster, and then a thick Compress with a bit of Money folded in it, as in the preceding; which Plaster and Compress must be sizeable to the Aneurism, or Tumor. Over the first Compress, including the Money, you are to apply several others, according as the Case may require, and retain the whole, by closely adapting the Bandage described in the preceding Paragraph, which Dressing is to be constantly wore for a considerable Time upon the Part. See an Example or two described by HILDANUS, *Cent. III. Obs. 43, 44.* But if this Bandage should prove insufficient, I refer you to the Method described Part II. Chap. XIII. and Plate XI. *Fig. 8 and 9.*

X. After bleeding, or opening a Vein in the Hand, particularly in the *Salvattella*, as 'tis commonly called, you fix two small Compresses on the Orifice, and, with a broad Piece of Tape upwards of an Ell long, you make two circular Rounds about the Carpus; thence guiding it over the back of the Hand, it passes betwixt the Ring and little Finger, then back again betwixt the first and middle Finger to the other Side of the Carpus, crossing the former like an X upon the Compress and Back of the Hand. This Course round the Ring-finger and Carpus, being thrice repated, the Bandage terminates by as many circular Rounds about the last, upon which its End is fastened.

Bandage for
Phlebotomy
in the Hand.

XI. After the Use of Medicines proper for Burns or Scalds, you then take a Piece of Tape six Ells long, and an Inch broad, rolled up with one Head. With this you make two circular Rounds about the Carpus, from whence it is carried a-cross the Palm of the Hand to the little Finger (*Tab. XXXVIII. Fig. 18. a.*) which is the first invested therewith by spiral ascending, and then descending. Turns down to its Root at the Hand, from whence it passes to the Ring-finger *b*, which it invests, in the same Manner, then to the middle Finger *c*, and the Index *d*, from the Bottom of which last it passes by the circular Turns *eee*, about the Metacarpus betwixt the Thumb and Fore-finger: then it invests the Thumb, *f*, in like Manner as did the Fingers, and from the Bottom of the Thumb it is carried on spirally upon the Remainder of the Metacarpus by the Rounds *gg*, the Fillet itself terminating at last circularly as it began, upon the Carpus. This Bandage, as it covers the Hand like a Glove, takes its Name from thence, and is called by the *French, le Gantelet*. It is of great Service in preventing the Fingers growing to each other, or to the Hand itself.

Bandage for
a burnt
Hand.

XII. A Fracture of the Thumb-bones, being adequately reduced by our former Directions for that Purpose, does then require a single-headed Roller, or Tape near two Ells long and an Inch broad, which you fasten on by two circular Rounds about the Carpus; and then proceeding to the fractured Part, you invest it by three circular Rounds, and placing two Splints of thick Pastebord on the Back and Inside of the Thumb about a Finger's Breadth, you then make three more circular Rounds upon the same. And, lastly, returning your Bandage to the Carpus, after making two or three Turns, it is there terminated and fastened. When both Internodes of the Thumb are fractured, you then also apply the same Bandage with very little Variation, only repeating the Rounds upon each fractured Part separately, and extending the Splints over both the Joints.

Bandage for
a Fracture
of the
Thumb.

XIII. For:

Bandage for
a fractured
Finger.

XIII. For a Fracture of the Finger you are to apply the preceding Bandage in the foresaid Manner upon the fractured Part; only you must afterwards bind the fractured to the next sound Finger, as a Support for it, till the Fragments are firmly united.

Bandage for
several Fin-
gers fractur-
ed.

XIV. When more than one of the Fingers are fractured, after an adequate Reduction, you take a Bandage three Ells long, and two Fingers broad, and, making two circular Rounds about the Carpus, you carry it from thence over the Back of the Hand to the affected Fingers, binding it round about all of them, so as to leave no Part uncovered. Then the Palm of the Hand is to be expanded upon a Piece of Pasteboard, *Tab. XXXVI. Fig. 5.* and to be secured in that Position by the Bandage. Though there are some, who think it better to retain the Fingers a little inflected, by grasping a large Ball, instead of the flat Splint, upon which first they are also to be secured by a Ligature or Bandage, as upon the Splints. And upon which soever of these you sustain the Fingers, the Bandage is at last to pass from the Fingers to the Carpus, upon which it must be fastened, and the Hand afterwards supported constantly by a Sling about the Neck.

Bandage for
luxated Fin-
gers.

XV. Luxations of the Fingers are generally so easy to cure barely by Extension, that there is seldom any Occasion for Bandage; except the Disorder has been long neglected, and the Joint appears extremely weak. Then you may apply a Band an Ell and half long, and a Finger broad, much in the Manner we directed for them when fractured, making first two circular Rounds about the Carpus: from thence you carry it over the Back of the Hand to the luxated Finger, binding it round the affected Joint, and, crossing it over the said Joint in a crucial Manner, pass it round the Carpus again: which Course, being thrice repeated, it terminates, and is fastened upon the Carpus. If more than one of the Fingers are luxated, they are each of them to bound up in this Manner separately: which kind of Bandage is usually termed by the *French, Le demi Gantelet*, or the half Glove, as investing the Hand only without the Fingers.

Bandage for
an amputat-
ed Finger.

XVI. When the End of a Finger has been either by Accident cut off, or designedly amputated on account of a Mortification, or a Caries of the Bone, after the usual Remedies laid upon the Wound, you apply the same Bandage and Dressings, which we before directed for the Penis. First some scraped Lint, then a Plaster and Compress in Form of a *Malta Cross*, *Tab. II. Fig. e*, and lastly a Fillet of a Foot long, and a Finger's Breadth, (*Tab. II. Litt. e.*) is to be closely and neatly applied round the Finger.

Bandage for
an Amputa-
tion of the
Hand, or
Cubitus.

XVII. After an Amputation of the Hand or Cubitus, first apply the Remedies, Lint, and Compresses, as we before directed in Sect. VIII. of our Chapter on the Operation. You then take a double-headed Roller about five or six Ells long, and three Fingers broad, and fixing about a Hand's Breadth of its Middle above the amputated Place *c*, *Tab. XXXVIII. Fig. 19.* you make three or four circular and tight Rounds, to secure whatever Dressings *a* are laid on the Stump. Then either of the Roller-heads is carried from *c*, over the Stump *d*, and, ascending up on the other Side, it is traversed by the other Head, which binds it down, and keeps moving round the Limb. Then the former Roller-head is reflected back a little obliquely over the Stump again to where it came from, and so on in the Manner we directed in making the Capeline for the Head and Clavicle:

Clavicle: which Course is to be repeated till the Stump and its Dressings are well covered. Then the shorter End of the Bandage is to be fastened down by the spiral Turns of the longer Head, by turning the first upward and downward, and the Extremity of the last must be well secured by Suture. You must observe to make this Bandage pretty tight, to retain the Dressings more firmly upon the Part, and to prevent the divided Vessels from bleeding, by compressing them. When your Deligation is compleated, the Patient must be put to Bed, and the amputated Limb raised upon a Pillow: and, to stop its bleeding the sooner and more effectually, an Assistant should compress the Parts with his Hands, till the Patient is out of Danger. The Bandage must not be loosened till the third Day, unless any thing particular require it; and then with great Caution and Gentleness. When the Patient is able to rise, the Stump must be rested in a Sling, hung round the Neck, till the Wound is quite healed.

XVIII. When the Arm is taken off above the Cubitus, or Elbow, having tied up the divided Arteries, and applied the usual Dressings, the Deligation must be performed almost in the same Manner with that in the last Paragraph; only your Roller must here be longer, about six Ells, and applied over a long and thick Compress, laid on the brachial Artery within-side the Arm, and extending from the Amputation to the Axilla. But when the Arm is amputated near the Shoulder, the remaining Stump being not longer than three or four Fingers Breadth; after taking up the larger Blood-vessels with Needle and Thread, it will be necessary to apply a double-headed Roller that is eight Ells long, and three Fingers broad, in such Manner that the Roller-head, which in the last Case made the Reflexions or Crosses over the End of the Stump, may here pass round the Thorax, under the sound Axilla: and this being brought round again to the Stump, you must therewith closely invest the same. For, without that Round about the Thorax, the rest of the Bandage will easily slip off from the End of the Limb. But if there is little or no Stump left behind, it will then be convenient to make your Deligation in the Manner we shall direct for an Amputation of the Arm in its Articulation with the Scapula in the subsequent Paragraph.

Bandage for
an amputat-
ed Arm.

XIX. In Case of amputating the Arm in the very Articulation of it with the Scapula, after treating the Wound as we before directed, (in Part II. Sect. I. Chap. XXXVII. Sect. VIII.) your Deligation must be compleated in the following Manner: Take a single-headed Roller ten or twelve Ells long, and four Fingers broad, the End of which is to be fixed under the sound Axilla, and there held by an Assistant. Then conduct the Roller-head a-cross the Breast to the amputated Shoulder, which it passes over, and returns cross the Back again to the sound Axilla. Which Course is again repeated, and the Roller is carried from under the sound Axilla, over the same Shoulder behind the Neck, and passing over the Amputation, it goes again over the Breast to the sound Axilla; and, passing round the same Shoulder, it now returns over the Breast, and crosses the former Turn like an X. This last Course being several Times repeated, the Remainder of the Bandage is spent circularly round the Thorax and amputated Part, to secure the Dressings, and confirm the whole Deligation: which being finished, the End of the Bandage must be securely fastened, where it terminates, by Suture.

Bandage for
an Amputa-
tion in the
Shoulder.

C H A P. VII.

Of Bandages for the Leg and Thigh.

Bandage for
a Fracture of
the Femur.

I. IN describing the Bandages for the lower Extremities, we shall first consider those which are proper to the Thigh, and then treat of those belonging to the Leg and Foot. And among the first, we shall begin with that for a Fracture of the Thigh-bone, which Bandage must be differently applied, according to the particular Circumstances of the Fracture, as it happens either in the Neck, lower, middle, or upper Part of the Femur. Different Artifices are also to be made in applying the Bandage, according as the Fracture is either oblique, or transverse, or below the Neck of the Femur. For, when the Fracture is below the Neck of the Femur, either in its middle, or towards the Knee, after the Reduction, &c. as in our Discourse on Fractures, you are then to apply three Bandages, two of which are to be four, and the other three Ells long, and each about three or four Fingers broad, all of them rolled up with single Heads. But before the Rollers are applied, you must dip a single piece of Linen (slit with four Heads as in *Tab. II. Fig. 18.*) in warm Wine, its Spirit, or *Oxycrate*, which is to be laid round the fractured Part of the Thigh, so that the Heads go over, or a-cross each other. Then a long and thick Compress is to be extended upon the Femur, according to the Length of the Thigh, in order to fill up the natural Excavation in the posterior Part of the Bone; lest, without this, the Bandage might too much straiten and elongate the Bone. This done, the Thigh is now to be taken hold of, above and below the Fracture, by two Assistants, who are to lift it up, while the Surgeon first applies the shortest Roller, beginning with three tight circular Rounds on the Part fractured, and as we before directed for the Arm in Chap. VI. Sect. I. Then the Roller ascends gradually by spiral Rounds towards the Inguen, where it terminates by two or three circular Rounds, and is then fastened. You next take one of the four Ell-rollers, and making two or three circular Rounds, where the preceding began, but, in a contrary Direction, and folding the Compress together, (*Compresse gradueé*, as the *French* term it) in the Manner of *Tab. IX. Fig. 1.* you descend by spiral Rounds down to the Knee, below which it terminates by two or three circular Rounds, and its End is then fastened. You must strictly observe to make the Rounds of your Bandage much tighter, when the Fracture is oblique, than when it is transverse. In the next Place, you apply four Compresses of about a Span in Length, and three Fingers Breadth, and over them four Splints of the same Length and Breadth, for retaining the Fragments of the Bone; though instead of four narrow Splints, you may conveniently apply two large ones, as M. PETIT advises. About the Splints you are to fasten the third and last Roller of four Ells long, beginning by two or three circular Rounds in their Middle over the fractured Part, from thence ascending by spiral Turns upward, and then descending in the same Manner, till the Splints are well covered, and the End fastened where it terminates, by Pin or Suture. Lastly, the whole Thigh is to be sustained by two other Splints of thin Deal, or stiff PASTEBOARD, dipped in warm

warm Wine, or *Oxycrate*; which are to be tied on by three or four Tapes, in the same Manner as we directed for the Arms in Chap. VI. Sect. I. *Tab. XXXVIII. Fig. 17. a a a, b b b.*

The Deligation being in that Manner compleated, the next Business is for the Surgeon to place the Thigh in the most convenient Posture, for which we use a kind of Mattress, or Straw-bed, furnished with two cylindrical Sticks covered with Straw, as in *Tab. IX. Fig. 5.* But here the two Sticks or Junks must not be both of the same Length, as they are for a Fracture of the Leg, or *Tibia*, for which this (*Fig. 5.*) is adapted. For that going within-side the Leg and Thigh, should be just long enough to reach from the internal Ankle to the Inguen. But the external one should reach from the Hip, or superior Part of the *Os ileum* to the external Ankle, or, as some will have it, be long enough to reach from the said Ankle, all along the Side of the Body to the Axilla. For if these Supporters are not long enough, especially in an oblique Fracture of the Thigh, there is great Danger of its contracting and becoming shorter than the other, which will necessarily subject the Patient to halt in his Gait. However, M. PETIT will not have the external one reach any higher than the upper Part of the Hip, which will prove always sufficient, provided the rest of the Deligation be tight. The Limb being thus carefully extended, so that the Great-toe may lie in a Line parallel with the Patella, or a little more outward, the Spaces about the Ankle and Ham are then exactly filled up with Lint or Tow. After this there are some Surgeons who invest the whole Leg and Thigh with large Compresses, which others think unnecessary, to guard against any Injury from the external Ligatures, seven of which will be generally sufficient to fasten the said Straw-case about the whole Leg and Thigh, each about a Yard long, and tied three about the Leg (as in *Fig. 20.*) three about the Thigh, and the last, or seventh, which must be longer than the rest, about the lower Part of the Abdomen. But some prefer the Application of a Napkin about the Abdomen, instead of the last Ligature. With regard to which Ligatures you must always observe, not only to place them under the Straw-case before the Limb is put into it, to avoid any Agitation thereof on this Occasion; but also to begin your tying of them with the middle one first, going on to each End, and making your Knots on the Outside of the Thigh, both for Neatness and Conveniency. At the Bottom of the Foot is to be placed the Sole of a Slipper, or a Piece of Pasteboard cut into a proper Shape, as in *Tab. IX. Fig. 6, 7.* which is tied on by the three Strings *a a a*, so that those two on the Sides may cross each other about the Knee or Ankle like an X (*Tab. XXXVIII. Fig. 20. e, f.*) pinning them to the Bandage: but the third, marked *g*, may be fastened to the most convenient Part of the Straw-case. And thus the Limb may be retained in the most commodious and natural Posture, that when the Cure is compleated, the Patient may not be incapable of standing upon his Leg, as hath been sometimes the Case. But to prevent the Foot-board from pressing too forcibly, and from being uneasy, you may interpose a soft Compress betwixt that and the Foot, as in *Tab. IX. Fig. 7.* In like Manner, you may also place a Sling of Linen under the Heel (*Fig. 8. a.*) to be tied round the Tarsus by the String *b b*, in order to prevent an Inflammation of the first, from the Pressure of the Calcaneum so long a Time against the Bed. But if that Contrivance does not free the Calcaneum from Un-

Position of
the Thigh
after Deli-
gation.

easiness, and the lower End of the *Tendo Achillis* be injured by the Pressure of the said Sling; it may, in that Case, be convenient to sew the two Heads of a broad Roller together at an Inch Distance from each other, as in *Tab. XXXVIII. Fig. 21.* The two Heads *a a* being fixed into the Excavation near the Ankle above the Calcaneum, will intercept the *Tendo Achillis*, and support the whole. Lastly, if this too should prove uneasy, which does sometimes happen, you may interpose some soft Lint betwixt them. In the next Place the Leg and Thigh are to be fixed in the Middle of a soft Pillow, which should lie higher under the Leg than Thigh; and which Pillow some Surgeons fasten to a smooth Staff extending from the Hip to the Calcaneum, to retain the whole Limb in its rectilinear Posture: and, to prevent the same from moving to either Side, Ligatures are fastened to the middle String on the Leg, and to Nails drove on each Side of the Bedstead, and then a Pair of Sheets are to be rolled up, and laid one on each Side the Limb. All which are equally necessary to be observed, as well for Fractures of the Leg, as of the Thigh. Lastly, Some apply a kind of Arch, made of small Hoops figured by *SCULTETUS* in *Tab. LVI. Armament. Chirurg. Edit. in 4^{to}, An. 1666.* or the one Half of a Drum or deep Sieve may be used instead thereof, to keep off the Bedcloths from pressing, so as to render the Limb uneasy. For the rest, you may consult what we have said in the Chapter on the Fracture of the *Femur*, in the Part of our Surgery.

Bandage for
an oblique
Fracture of
the Femur.

II. In an oblique Fracture of the Thigh, it will not only be necessary to make the Bandage stricter, but also to be more solicitous to keep the Limb duly extended. For this Purpose you ought therefore to observe what has been said at *Sect. VIII.* of our Chapter on this Fracture, with what follows. Betwixt the Thighs you must place a large Linen-cloth folded together, so that it pass over the Inguen of the affected, and under the Buttock of the sound Thigh, the Ends of which Cloth are to be nailed on each Side of the Bedstead, to keep the Patient's Body from descending. Then another Ligature must be made above the Knee upon the Thigh affected, which must again be fastened to the Bottom of the Bedstead, to prevent the Limb from contracting upward. If these Ligatures or Stays should in Time prove uneasy, you must change their Places, the upper one passing now under the Buttock of the affected Thigh, and up over the Inguen of the sound; and the lower one taken off from the Knee, and applied to the Ankle, and so alternately, till the Callus of the Fracture is firm enough to resist the Contraction of the Muscles, which would otherwise render that Thigh shorter than the other. The Surgeon will also do well to let the Patient have a little Block covered with Linen, at the Bed's Feet against his sound Foot, that thereby he may raise himself, and extend the other, when he finds his Body has descended. Which Precautions are also necessary to make an exact Cure of transverse Fractures of the Femur, though more especially for the oblique.

Method of
renewing
the Bandage.

When the Bandage has been well applied, and nothing extraordinary forbids, it should not be taken off, and renewed before the eighth or tenth Day. But if the outermost Bandage appears too tight or lax, or some other Cause should make it necessary to renew the same, it must be taken off, and re-applied with great Caution: nor ought the second and third Roller to be taken off before the
End

End of the Fortnight. And the last should continue on till the Cure is compleated, which is seldom accomplished in the Fragments of this very large Bone, before the sixth Week after the Reduction of the Fracture: which will even require eight, nine, or ten Weeks for a Cure, in Patients of a bad Habit, or far advanced in Years. And though the Callus may seem sufficiently firm, and the Cure compleat, at the Expiration of that Time, yet the Patient ought not to walk for a considerable Time afterwards without Sticks, and even Crutches at the Beginning: else he will be in Danger of relapsing into a second Fracture of the lately reduced Bone.

III. For a Fracture in the Neck of the Thigh-bone, you must apply the Bandage, which we before described in Chap. V. Sect. VIII. under the Denomination of *Spica Inguinalis*; the Form of which we have represented in *Tab. XXXVIII. Fig. 16.* But here your Roller must be four or five Ells long, and three or four Fingers broad, which must be very strictly applied, and the Limb kept well extended downward; or else the Contraction of the femoral Muscles is so strong, that the lower Part of the Bone will be drawn above the upper, so that its Neck cannot unite with its Head: consequently that Leg will be shorter than the other, and the Patient must halt. Towards the End of your Roller it must terminate by circular Rounds about the Thigh, and be fastened by Pins or Suture. The Limb is then to be fixed in a Straw-case, as before, and the Patient ordered to lie very still in his Bed. For the rest, you must observe what has been said in the two preceding Paragraphs.

Bandage for a Fracture in the Neck of the Femur.

IV. The *Femur* is nothing near so easily or frequently luxated by external Violence, as is commonly imagined; but it may be so more frequently from internal Causes, mentioned in our professed Chapter on this Subject. But as, when the Head of the *Femur* is thrust out of its Socket, and its Ligaments debilitated by a Collection of viscid Humours, or a scrophulous State of its mucous Glands, those Humours are very difficult to disperse or remove, 'tis no wonder that Patients thus afflicted are scarce ever cured, without halting afterwards. However, to afford all the Assistance we are able, a Compress dipt in warm Wine, or *Oxycrate*, must be first laid round the Juncture of the Thigh, and then secured by the *Spica inguinalis* Bandage before described in Chap. V. Sect. VIII. and represented in *Tab. XXXVIII. Fig. 16.* And, lastly, the Patient must rest in his Bed for a Month: when it proceeds from some Disorder or Distortion of the Ligament, you ought every Day to repeat often Fomentations *ex Sp. Vini Red. Sp. Matricali, rorismarini, Lavendulæ, &c.* with the Use of Baths and proper strengthening Plasters.

Bandage for a Dislocation of the Femur.

V. We have elsewhere observed, that the Patella may be fractured either in a perpendicular or transverse Direction. The most convenient Deligation for the first, will be, after Reduction, and defending the Tendons in the Ham by a thick Compress, to apply the uniting Bandage, *Tab. II. Fig. 1.* of about three Ells long, and two or three Fingers broad, slit in its middle longitudinally for about three Fingers broad, and rolled up with two Heads. 'Tis applied much in the same Manner with that for longitudinal Wounds in the Forehead, Chap. II. Sect. V. *Tab. XXXVII. Fig. 3.* That is, the Middle of the Slit being laid on the Patella, one of the Roller-heads is carried round the Ham, and passed through the said Slit, and by drawing the two Roller-heads tight in each

Bandage for a perpendicular Fracture of the Patella.

Hand

Hand, the Bandage by that Means closely and adequately invests the Articulation and fractured Patella, whose two Sides are thus retained close to each other. Then each Head of the Roller is carried above, and below the Knee as long as the Bandage will permit, till its End terminates, and is fastened in the same Course: but in the mean Time you search with your Fingers, to know if the fractured Parts of the Patella are adequately replaced and conjoined. Being thus far advanced, you now impose a Compress on the Patella, and fix a stiff Plaster-board Splint in the Ham, both which are to be previously dipped in warm Wine, and retained by a Bandage of two or three Ells long, to be spent round the Part in a spiral Course: which last Part of the Dressing is to keep the Knee duly and equally extended, till the fractured Parts are conjoined by an uniform Callus. Lastly, you apply the Straw-case, *Tab. IX. Fig. 5.* by tying it on the Leg with three or four Tapes, as in *Tab. XXXVIII. Fig. 20.*

Bandages for
a transverse
Fracture of
the Patella.

1st Method.

VI. When the Patella is fractured in a transverse Direction, as it is much more frequently than in the perpendicular one, after the Extension of the Limb, and Approximation of its fractured Parts, with the usual Dressings of a Plaster, &c. as in our Discourse on this Fracture; you then take a Bandage of three Ells long, and as many Fingers broad, which may be applied in a two-fold Manner, according as it is rolled up, either with but one or with two H-heads. The first, or double headed Roller, is applied immediately above the Knee, by making a circular Round *d* about the Thigh, above the superior half of the Patella *a*, *Tab. XXXVIII. Fig. 22.* Then the Roller-heads, crossing at the Ham, are brought obliquely forward below the Knee, in the Round *e*. They are then carried back again, and the same Course repeated above and below the Patella, as long as the Roller lasts; observing, in the mean Time, to keep the fractured Parts adequately together in their due Position.

2^d Method.

The second Method of applying this Bandage is, by rolling it up with a single Head, and fixing its End immediately above the reduced Fragments of the Patella, at the Knee, marked *a*. You first make several circular Rounds about the Thigh *b*, to be fastened on the End of the Bandage, from whence you carry the Roller-head obliquely behind the Ham, to the upper Part of the Leg below the Knee, where you make the circular Round *e*, close to the interior Half of the Patella, thence taking it obliquely a-cross the Ham, traversing the former, you go round the Bottom of the Thigh *d*, thence again descending below the Knee like a Figure of 8. Which Course is to be repeated till the Bandage is spent. In the next Place, you must here also observe to keep the fractured Parts adequately together during the Deligation. When that is finished, you must apply a Compress, dipt in warm Wine, or *Oxyerate*, to the Patella, and a Splint to the Ham, which are to be secured by a separate and spiral Bandage as before, that the Knee may not have the least Motion, which would be here highly injurious. There are some Surgeons, who apply a peculiar Instrument to keep the Leg extended, and from moving; for which consult our Chapter on this Fracture, in the first Part of our *Surgery*. Which Instrument is frequently attended with the desired Effect. Lastly, you may apply the Straw-case upon the Leg, as in *Tab. XXXVIII. Fig. 20.* in order to compleat your Retention thereof. But as it will be impossible to avoid some Stiffness of the Joint, by keeping the Limb thus extended without the least Inflection, for so long as nine or ten Weeks, the Patient

Patient will consequently halt more or less with that Leg. This you must endeavour to mitigate and remove, by the frequent Application of emollient Topicals, as Ointments, Fomentations, &c. giving the Joint an ample and frequent Motion afterwards. We shall conclude with the common Observation, that they who have once fractured this Bone, will, from the Weakness and Stiffness of the Joint thereby induced, be continually subject to stumble, or halt more or less, and will therefore hardly escape breaking the other Patella, or the same at another Time.

VII. As it is so difficult to retain the Fragments together in a transverse Fracture of the Patella, Surgeons have therefore invented another kind of Bandage, which they make of a Piece of Linen, about two Feet long, and thrice folded together, so as to be eight Inches broad. Out of this, *Tab. XXXVIII. Fig. 23.* they cut a Piece *CD*, about two Inches broad from the End *BB*, leaving the End *A* entire. The Part *C*, which is thus evacuated, to adapt it to the Patella, is then applied above the Knee as betwixt *d*, and *b*, *Fig. 22.* so that the Excavation may invest the Patella. In the next Place, they apply the single-headed Roller preceding by three Rounds about the Thigh, over the Cloth or Compress, in the Course of *d*, *Fig. 22.* over these Rounds they reflect the entire End of the said Cloth, and then repeat the Round at *d* thrice more, to bind down and secure the same. Then they take the two Ends of the said Cloth (*Fig. 23. BB*) on each Side of the Patella, and order an Assistant to draw them down tight, that the superior Half of the Patella may be brought to the inferior: then the Roller, crossing over the Ham, forms three circular Rounds *e*, *Fig. 22.* below the Knee or Patella, upon the two Ends of the Cloth, and the two Ends of the said Cloth are next turned back over the first Rounds. Lastly, the Roller again passes thrice about them circularly, to secure them firmly, the Remainder of the Bandage being spent in Turns above and below the Patella, and its End is fastened by Pin or Suture where it terminates. You may also use the double-headed Roller for this Purpose, as well as the single one now mentioned. You must dispose the Limb for rest in the Manner before prescribed.

A third
Bandage for
a Fracture
of the Pa-
tella.

VIII. We cannot describe a more convenient Bandage for a Luxation of the Knee, than those before ordered for the Patella; especially that for the transverse Fracture of the Patella. The Patient ought to keep his Bed and Chair at least eight Days before he walks, that the Ligaments may recover their Tone, and become sufficiently firm.

Bandage for
a Dislocation
of the Knee.

IX. For the Deligation of the Tibia after its Fragments are reduced, two Bandages are required, the one five, and the other three Ells long, each being three Fingers broad. To these add four Compresses, and as many Splints, each a Span long, with the rest of the *Apparatus* described at the Beginning of this Chapter, Sect. I. for a Fracture of the Thigh. Your Deligation is performed first, by investing the fractured Part with a Piece of Linen slit as in *Tab. II. Fig. 18.* and dipped in Spirit of Wine, or *Oxycrate*, disposing its Heads on the Fracture, so as to decussate, or cross each other. Then three circular Rounds are made with the first Bandage over the Cloth upon the Fracture, and ascending spirally about the Tibia, it at Length goes round above the Knee, and then descends spirally on the Tibia, upon which, by Reason of the Inequality above and below the Middle of the Calf, it may be proper to re-invert the Roller, as

Bandage for
a Fracture
of the Tibia.

Bandage
of leg
1st is 5
2^d is 3
9 inches

we have directed for the re-inversed Bandage. You now apply the Compresses and Splints to the Leg, as we before directed for a Fracture of the Arm: but the Compresses must here be folded together towards their Bottom, to fill up the Inequality of the Leg near the Ankle, that the Tibia may be every where equally constringed. See *Tab. IX. Fig. 13.* Lastly, you apply two Pasteboard Splints, dipped in warm Wine, or *Oxyerate*, and tied on by three or four Tapes: then you support the Leg with the Straw-case or Junks, *Tab. IX. Fig. 5.* and *Tab. XXXVIII. Fig. 20.* which must be long enough to extend not much lower than the Ancles, and not above a Hand's Breadth beyond the Knee, tied on by three or four Strings, *a, b, c, d,* and the Spaces filled up with Tow or Lint. And, lastly, a Foot-board with its Sling for the Heel, *Tab. IX. Fig. 6, 7, 8.* must be fixed to the Bottom of the Foot, as represented in *Tab. XXXVIII. Fig. 20. C.*

Bandage for
a Fracture
of the Tarsus
and Metatarsus.

X. The Deligation for a Fracture of the Tarsus and Metatarsus, after Reduction, may be made either with a single or double-headed Roller, three Ells long, and two or three Fingers broad. That with two Heads is applied first over the upper Part of the Compress, and round the Ankle, as in *Tab. XXXVIII. Fig. 24. A;* then, crossing like an X over the Junction of the Foot, the Roller-heads are carried down round the Tarsus and Metatarsus, and, crossing again under the Sole of the Foot, they rise up, and cross upon the Instep, or Metatarsus, and, going round the Angles, are there fastened, after two or three circular Turns.

The single-headed Roller.

The Roller with a single Head is fastened on by two or three Rounds about the Ankle, from whence descending obliquely over the Instep under the Bottom of the Foot; and from thence rising up, it goes over its former Course on the Instep, or Tarsus, like an X, and so round the Ancles, so that it resembles a Figure of 8 about the Foot and Ankle. The Remainder is spent circularly round the affected Part of the Tarsus, where its End is fastened. In very bad Fractures of this Part, the Foot should be placed in a Straw-case with a Foot-board, *Fig. 20.* This Species of Bandage may be used for Fractures of the Toes, if you invest them spirally, as directed before for the burnt Hand and Fingers, and then tie on a Foot-board or Pasteboard Splint like a Sandal, as they are figured to have been wore by the Ancients.

Bandage for
a Luxation
of the Foot.

XI. For a Luxation of the Tarsus or Ankle, after reducing and treating it, as we have directed in our Chapter on that Subject, your Deligation may be performed in the same Manner as we have but now prescribed for a Fracture of the Tarsus: The Patient should, in this Accident, keep his Bed and Chair for a few Days, and, in the mean Time, often bathe the Part with some strengthening Spirit, till the Ligaments become robust, and the Pains vanish.

Bandage for
Phlebotomy
in the Foot.

XII. That the young Surgeon may not be ignorant how to apply the Bandage after Bleeding in the Foot; he must know, that it is made with a single-headed Roller an Ell and a half long, and two Fingers broad, the End of which is laid over the Compress, and there held with his left Thumb, so as to let about a Span of it hang down on the Outside of the Foot, as in the Deligation for Phlebotomy in the Arm. Then conducting the Roller obliquely over the Tarsus, and round under the Foot, and over the Compress two or three Times circularly like a Stirrup, it then goes obliquely from over the Tarsus round the

the Ankle, and from thence again obliquely over the Compress, down under, and round the Foot, and then again about the Ankle. Which Course being repeated till the Bandage is almost spent, you tie the two Ends together upon the Outside of the Foot; as in *Tab. III. Fig. 1. E.* Some begin this Bandage by two or three circular Rounds about the Ankle, then pass obliquely over the Tarsus and Compress, under the Foot; and so up, and a-cross the former Turn, like an X, and then again round the Ankle, as in *Tab. XXXVIII. Fig. 24. A. B.* fastening the last End either by Pin or Suture. There are yet other less considerable Methods of making the Deligation after Phlebotomy in the Foot: but as in all of them there is some Resemblance of a Stirrup, the Bandage is therefore usually denominated the *Stapes*.

XIII. When you bleed in the Sura, which I judge the safest of any in the lower Extremity; your Bandage should be a single-headed Roller, two Ells in length, and two Fingers breadth. The first End of it should hang down about a Span on the upper Part of the Sura and the Inside of the Tibia. From hence the Roller is conducted over the Compresses on the Wound (which are to be held with the left Thumb) obliquely downward to the lower and inward Part of the Sura, where it passes round the Tibia, and from its Outside ascends again obliquely to its Inside at the Ham: under which, it runs again round the Tibia, and returns to its Beginning. It then repeats its first Course, making some Folds round the Sura in Form of the Figure 8. And, lastly, the two Ends are tied together in a Knot under the Ham.

Bandage for
Phlebotomy
in the Sura.

XIV. For an Amputation of the Leg, or Thigh, after the proper Dressings are applied, your Deligation is compleated in the Manner we prescribed for an Amputation of the Arm, viz. by the *Capeline*, or reflexed Bandage, described in Chap. VI. Sect. XX. *Tab. XXXVIII. Fig. 19.* only the Leg and Thigh require the Roller to be longer than that of the Arm.

Bandage af-
ter an Am-
putation of
the Leg or
Thigh.

C H A P. VIII.

Of the Deligation for a compound Fracture of the Leg.

I. **F**OR a compound^a Fracture of the Leg, after reducing the Fragments, cleansing the Wound, and the Imposition of proper Remedies or Dressings, we then apply a Bandage peculiarly adapted to the Case, furnished with eighteen Heads, or Leaves, like a kind of Book, (as in *Tab. IX. Fig. 4. B. B.*) and therefore the *Germans* call it the *Book-band*. This is extremely well adapted for a compound Fracture, as it may be open or bound up, and the Dressings renewed without moving the Limb: whereas those used in simple Fractures would distort the Fragments, and prove very inconvenient and hurtful. We shall therefore be very explicit in our Account of the Deligation with this Bandage.

Bandage for
a Fracture
of the Tibia
with a
Wound.

^a The Ancients used the very same Bandage for compound, as for simple Fractures, as we learn from *CELSUS. Lib. VIII. Cap. X. N. 7.*

Previous
Disposition
of the Ban-
dage.

II. Supposing your Fracture of the Tibia to be accompanied with an external Wound of the Integuments, as represented in *Tab. IX. Fig. 4.* A. after your Reduction of the Fragments, cleansing of the Wound, and dressing with scraped Lint, and proper Medicines, you then take the Straw-case, or Bed, *Tab. IX. Fig. 5.* AA, BB, having three or four Pieces of Tape, each a Yard long, placed under it; over which Case you again lay three other such Ligatures in a transverse Direction, and upon them the eighteen-headed Bandage, with its Leaves expanded, as in *Fig. 4. BB.* and in *Tab. XXXVIII. Fig. 25.* CC, DD, EE. Along the Middle of the Bandage is to be laid a Compress of the same Length, and a Hand's Breadth. And thus you have the whole ready for receiving the Leg.

Its Applica-
tion.

III. Your next Business is to place the Bandage and *Apparatus* under the fractured Leg, whilst it is held up in a convenient Posture by an Assistant; (see *Tab. IX. Fig. 4. Tab. XXXVIII. Fig. 25.*) and then to apply the two middle Leaves dipped in Spirit of Wine, or *Oxycrate*, next the Leg, a-cross each other over the Dressings upon the Wound, and round the Tibia. Then you proceed to apply the two lower Leaves, and then the two upper, all of the first Order, exactly a-cross each other, not quite even and circularly, but a little obliquely, in the Manner of CCC, DDD *Tab. XXXVIII. Fig. 25.* This done, you must next apply the Leaves of the next succeeding Order in like Manner with the former, beginning with the middle ones, and ending with the uppermost, and drawing them close round the Leg, as in *Fig. 25.*

Application
of the
Splints and
Compresses.

IV. When your eighteen-headed Bandage has been thus applied, you are next to lay two Compresses, one on each Side the Tibia, to whose Length they should be equal, and two or three Fingers Breadth, folded together towards the Ankle, as we observed in Chap. VII. Sect. X. See *Tab. IX. Fig. 13.* But they should be first dipped in warm Spirit of Wine, or *Oxycrate*. Then imposing them on each Side the Tibia upon CCC, and DDD *Fig. 25. Tab. XXXVIII.* you place the six largest Leaves of the last Order over them, marked EE, FF, GG, beginning, and proceeding in that Order. Two other Compresses are then imposed with a Splint of stiff Pasteboard, which are tied close round the Tibia by three Tapes, before placed under it for that Purpose, making your Knots on the Out-side of the Leg.

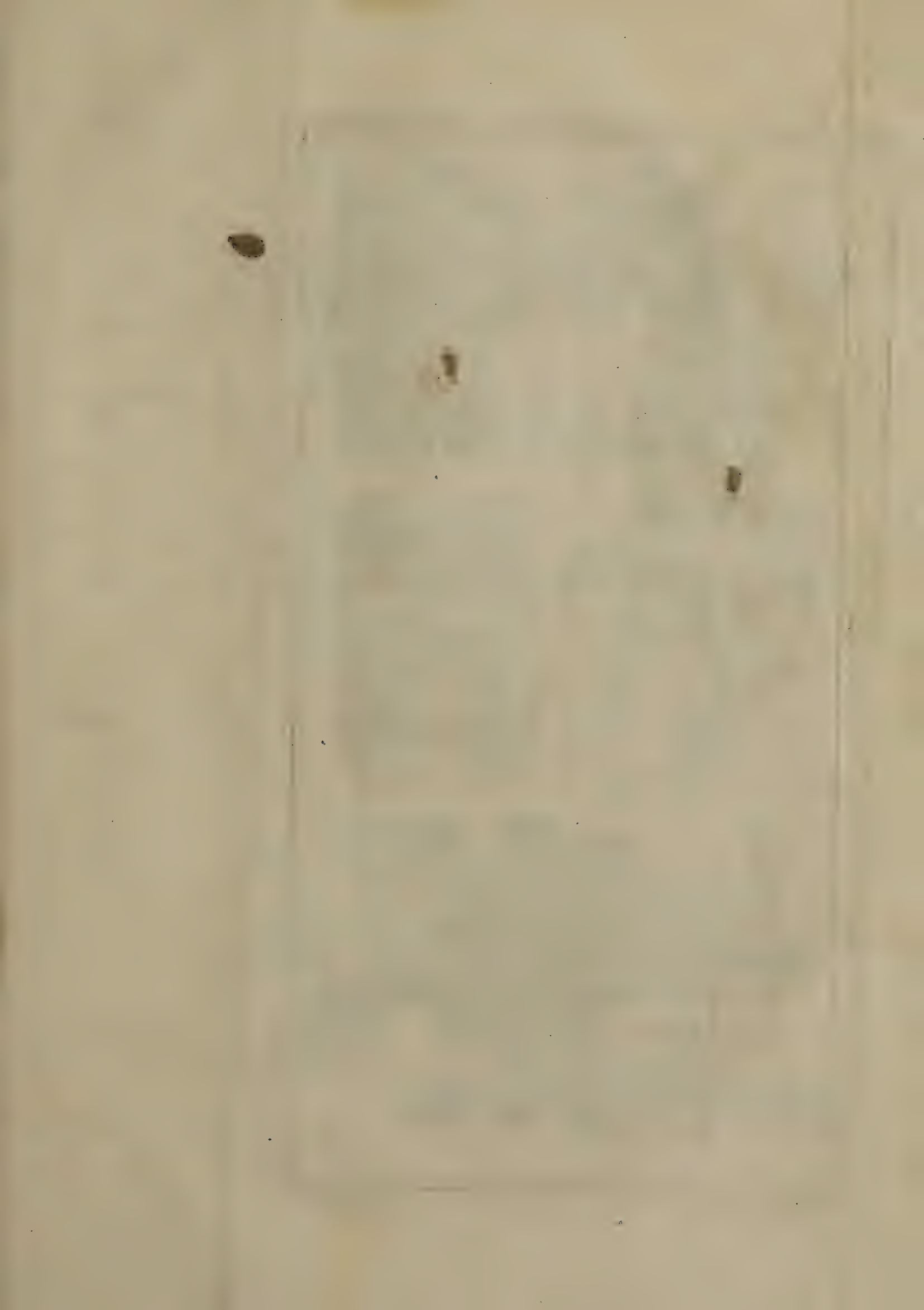
Posture of
the Leg af-
ter Deliga-
tion.

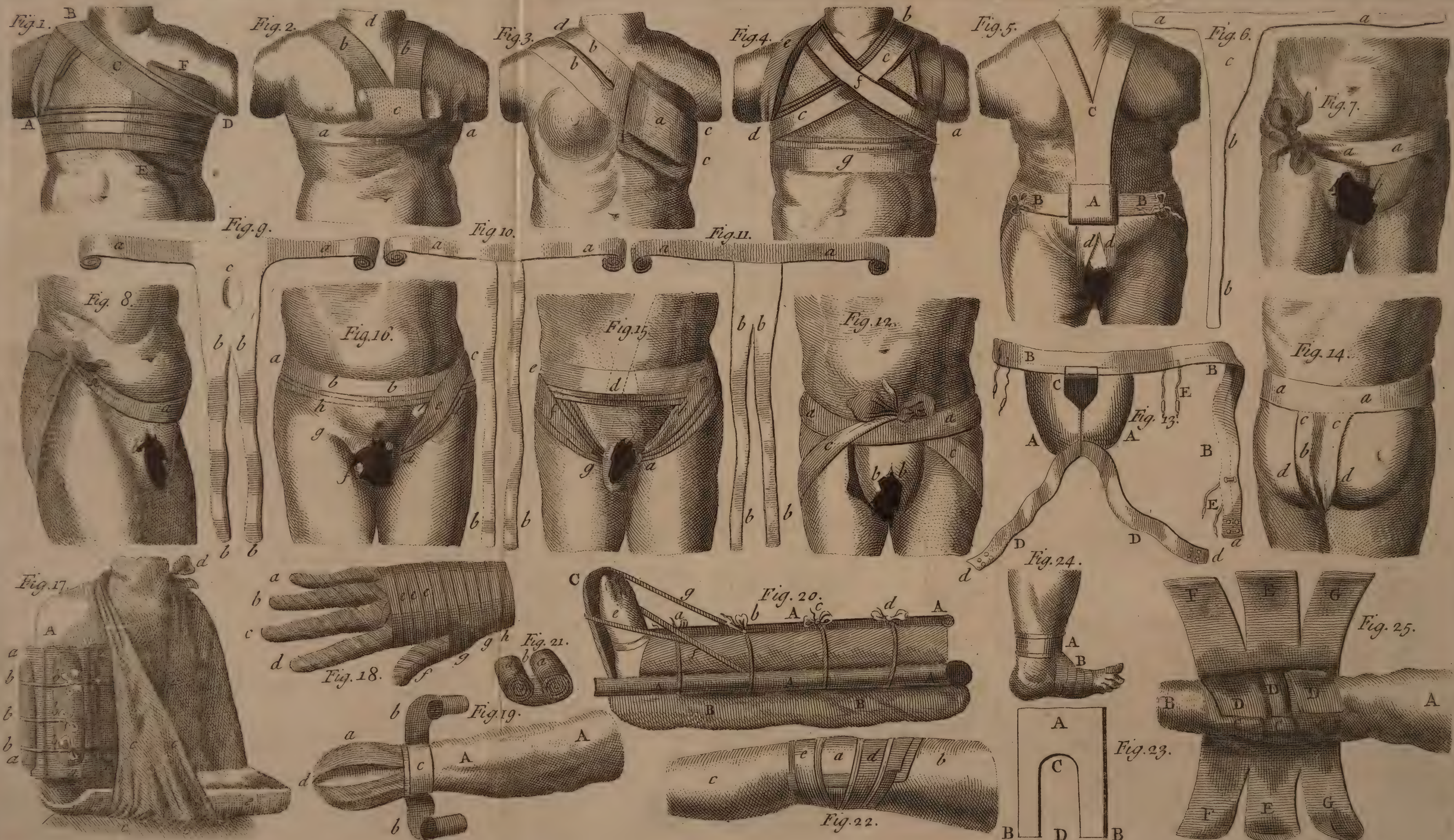
V. The Deligation being thus compleated, the Leg must now be disposed to rest in the most convenient Posture, as in simple Fractures. For this End the Ancients fastened a Pillow round the Leg, as may appear from the Figures and Writings of SOLINGEN, PURMAN, and others. But as their Method of retaining the Leg is not sufficiently firm and secure, it is more adviseable to use the Straw-case often mentioned, and described in Chap. VII. Sect. IX. And, for the rest, with regard to the quiet Posture and Support of the Foot and Heel, they must be conformable with what was before proposed in the Deligation for a Fracture of the Femur, Chap. VII. Sect. II. as described in *Fig. 20.* of Plate XXXVIII.

Renewal of
the Dress-
ings.

VI. After the second Day it will be necessary to renew your Dressings and Deligation daily, or every other Day, according to the Quantity of Matter discharged. While you are performing this, the Leg must be discreetly and firmly held up by an Assistant, so that the Fragments and injured Parts may

not





not be disturbed. After cleansing and dressing the Wound, the rest are to be applied as before at Sect. III, & *seq.* Which Process must be repeated till the Wound is healed: and if that should happen before the bony Fragments are well united, it will be convenient to apply a common Bandage, or Roller, as in simple Fractures. Clean Bandage and Dressings must be applied with Care when the others are foul. As for retaining the Leg in the wooden Case of SCULTETUS, *Tab. LVI.* that is less used, and more unhandy, than the Straw-case, especially in Camps, where these Fractures are very frequent, otherwise it is no despicable Machine.

VII. As for compound Fractures of the Leg, in which the Bone is much splintered, or the Wound greatly contused, or lacerated, it will be necessary to keep the Limb more exactly steady, and at rest, than the Straw-case will admit of. Surgeons have therefore contrived a Machine peculiarly adapted to the Purpose, and consisting of three Brass-plates joined together by Hinges, *Tab. IX. Fig. 9.* which are to be applied together with the Foot-board, *Fig. 6, 7, and 8:* though there are some, who, notwithstanding, prefer the Straw-case even before this. But we are furnished with a much more laudable and curious Machine contrived for this, and other Fractures, by the ingenious Mr. PETIT, of which we find an accurate Description and Figure in the History of the Royal Academy of Sciences at *Paris*, for the Year 1718, as also in its Author's Treatise on Diseases of the Bones. We have given you the Figure and Description of its several Parts in our *Tab. IX. Fig. 11, and 12;* and in Chap. X. Sect. II. of our Book on *Fractures*, we have considered it at large^a.

Machines
for a frac-
tured Tibia
with a lace-
rated or con-
tused Wound

VIII. Lastly, for a Fracture of the Thigh with an external Wound, you must apply the same eighteen-headed Bandage we have now described for the Tibia; only here both it and the Straw-case must be proportionably larger^b. For the rest, though a Compound Fracture of the *Humerus*, or *Cubitus*, may be commodiously enough invested with this eighteen-headed Bandage, yet we generally make the same Deligation here as in simple Fractures of those Parts; because the Bones, being pendulous, are more commodiously invested, and better secured by the Roller, than by the Bandage with eighteen Leaves. And thus have we, through the Blessing of God, finished that most necessary and important Branch of Surgery, the Application of Bandages, and at the same Time brought our Chirurgical System also to a Period; being satisfied that if what is here proposed be well understood, the Operator will be thereby easily enabled to invent others for any particular or uncommon Case that may come under his Care.

Treatment
of other
compound
Fractures.

An EXPLANATION of the THIRTY-EIGHTH PLATE:

Fig. 1. Shews the Bandage for an Amputation of a cancerous Breast: in which A B C D denote the first Course of the Roller, E E the Compresses on the Dressings.

^a We have a remarkable Fracture with a Wound described by VERDUC in his Treatise on Bandages, Chap. 44. and in SCULTETUS, Obs. 82 and 84.

^b Observations on a Compound Fracture of the Thigh, are given us by SCULTETUS, Obs. 77 and 78.

Fig. 2. Represents the Method of applying the T Bandage of HELIODORUS for Disorders of the Breast: *a a* the transverse Part which goes round the Thorax under the Breast; *b b* the two Ends of it slit, or perpendicular Part going over the Shoulders, and the Part covering the Breast; *d* the Neck intercepted by the Slips *b b*.

Fig. 3. Denotes the four-headed Bandage for Disorders of the Breast: *a* the entire Part of it laid over the Breast, *b b* its two upper, and *c c* its two lower Heads, which are tied together near the sound Shoulder *d*.

Fig. 4. Represents the *Quadriga* Bandage for investing the Thorax: in which *a b c d e f g*, denote the first and successive Turns of the Roller, described at large in Chap. IV. Sect. XIV.

Fig. 5. Gives a View of the Bandage for an *Omphalocoele*, or umbilical Rupture. *A* the Compress preventing an Extrusion of the returned *Omentum* and Intestines; *B B* the Girdle Part that invests the body; *C* the Scapulary sustaining the former; *d d* two Slips of the Bandage which, passing betwixt the Thighs, are carried round the Nates, and fastened to the Belt near the Hips at *B B*, that the Compress may not recede either above, or below the Navel.

Fig. 6. The Bandage for the Inguen; *a a* going round the Body *b b* betwixt the Thighs and *c* investigating the Inguen, as you may also observe in

Fig. 7. The same inguinal Bandage applied to the Body.

Fig. 8 and 9. Shew the Bandage for investing the Scrotum: *a a* the transverse Part that goes round the Body: *b b* its perpendicular Part slit in the Middle, and perforated by the Aperture *c* to transmit the Penis, *Fig. 8.* shews it fastened to the Body.

Fig. 10 and 11. Are different Forms of the double T Bandage for various Uses.

Fig. 12. Shews the last of them applied to the Body for investing the Scrotum.

Fig. 13. Exhibits a Compound Bandage for the Scrotum, termed the *Suspensor*, and by the French, *La Bourse*: *A A* the Part which receives the Scrotum like a Purse. *B B B* the Girdle Part for investing the Body, *C* the Aperture to transmit the Penis, *D D* the two Heads which pass betwixt and round the Thighs, and are fastened upon the Hips by the Holes *d d*, with the Strings *E E*.

Fig. 14. Shews the Method of applying the T Bandage, *Fig. 11.* for Disorders of the Anus: *a a* the transverse Part fastened round the Body; *b* the unslit End of the perpendicular Part retaining the Dressings on the Anus, joined to the other Part by the Suture *c c*; *d d* the lower Ends passing betwixt the Thighs, and fastened before at the Pubes, or each Inguen, as in *Fig. 12*.

Fig. 15. Represents the double and knotted Bandage for each Inguen, serving many Uses, and especially to restrain the Bleeding after Lithotomy, or Syringotomy: its Application is described at large in Chap. V. N. VII. *a b c d e f g* shew the principal and successive Turns in it, and the dotted Lines crossing the Abdomen from *a* to *b*, and *g* to *i*, denote two Rounds under the Perinæum, and over the Shoulders, to compress the Parts more effectually.

Fig. 16. Is the *Fascia inguinalis simplex*; which beginning at *a*, goes in the Course *b b* to *c*, and thence by *d e* to *c*, and again to its Origin *a*.

Fig.

Fig. 17. Represents a fractured Arm A, secured with Splints and Compresses *a a a* tied over the Bandage by the three Strings *b b b*, with Knots on the Outside of the Arm, and suspended by the Sling or Napkin about the Neck *c c c c*, tied in a Knot on the sound Shoulder *d*, and sustaining the Pastedboard Case *e e*, for a Fracture of the Cubitus; which last is unnecessary for a Fracture of the Humerus.

Fig. 18. Shews the Bandage for investing a burnt, or scalded Hand; the Application of which is described in Chap. VI. Sect. XI. preceding.

Fig. 19. Represents the Manner of binding up a Stump of the Cubitus, after amputating the Hand. A A the Arm and Part of the Cubitus; *a* the Stump dressed; *b b* the two Roller-heads carried round the Compresses in the Circle *c*, and then crossed over the End of the Stump *d*, as in the Capeline, or Reflex-bandage.

Fig. 20. Exhibits a Straw-case, and the Manner of fixing it to the Leg: A A A A are two cylindric Bundles of Straw, with a Stick in the Middle of each; B B the subjacent Pillow; C the Foot-board; *a b c d* four Tapes by which the whole is tied fast to the Leg by as many Knots on the Outer-side; *e f* the two Ligatures with which the Foot-board is fastened to the Straw-cylinders on each Side in a cross Direction; *g* the uppermost Ligature of the Footboard fastened a little higher to the outer Cylinder.

Fig. 21. Is a double-headed Roller, sewed together at each End so as to leave an Inch Space in the Middle *b*, for sustaining the Heel and *Tendo Achillis* in Fractures.

Fig. 22. Exhibits the Deligation for a transverse Fracture of the Patella: *a* the Patella; *b* the Thigh; *c* the Leg; *d e* the Turns above and below the Patella like a Figure of 8, crossing in the Ham.

Fig. 23. Gives the Shape of a Linen-compress, to draw and keep down the superior Part of the Patella in a transverse Fracture of it, as in Chap. VII. Sect. VII. preceding.

Fig. 24. Shews the Deligation to be applied for Phlebotomy, a Fracture or Luxation of the Foot: A the circular Rounds above the Ankle; B the spiral and circular Turns about the Tarsus and Metatarsus.

Fig. 25. Teaches the Method of investing a compound Fracture of the Tibia, with the eighteen-leaved Bandage. A the Thigh; B the lower Part of the Leg; C C C, D D D the oblique Position of the Leaves a-cross each other upon the Fracture; E F G the six outermost Leaves to be applied over the Compresses obliquely in that alphabetical Order as they are marked.

An EXPLANATION of the THIRTY-NINTH PLATE.

We have here a new Kind of Lever from PETIT, for elevating the fractured and depressed Bones of the Cranium, which he has described and delineated in the *Memoirs of the Chirurgical Academy at Paris*, Tom. I. 1743. p. 302. It consists of two principal Parts; namely, the Lever itself, and the Fulcrum, which the Mechanics call an Hypomochlium or Roller.

Fig. 1. Exhibits the Lever, about eight Inches in Length, four or five Straws in Breadth, and in Thickness two. It is made strait, excepting a small Curvature at:

at the Point ABC, called the shorter Branch, which is somewhat narrower, taperer than the other Parts, that it may enter more commodiously under the fractured Bone. This Curvature has also some transverse Notches in the upper Part (See *Fig. 3. A C.*) to keep the Lever from running too deep under the fractured Bone, and thereby injuring the Dura Mater, or even the Brain. The opposite Part of the Point (*Fig. 1. C.*) is roundish and smooth, to prevent the like Injuries in its Introduction.

The other Part of this Lever, called the longer Branch, in its Surface DE, which is the lowest, is perforated in the Middle with some small Holes lengthways, about two or three Lines distant from each other, to receive the Screw of the Fulcrum, (*Fig. 2. A.*) that the Surgeon may at Pleasure draw it nearer to the Curvature ABC. (*Fig. 1.*) or remove it further from it.

Hence it has this Convenience, that the Fulcrum may be fixed nearer to, or more remote from, the Fracture; and consequently have a greater or less Force given it, as the Case requires. The Handle F is made of Wood.

Fig. 2. Is the other Part of this Lever, which he accounts the principal, and is, according to Mechanics, the Fulcrum for sustaining it in raising a Weight. A is the Screw, which is fixed in one of the Holes in the Lever (*Fig. 1. E E.*) as the Surgeon thinks proper. This prevents the Lever's receding from its Fulcrum, which might be attended with very bad Consequences. The Part, which is towards the Cranium, is formed like an Arch, (*Fig. 4. B C B.*) that it may not rest upon the Cranium, but at the two Extremes DD, which for many Reasons should be made broad enough and covered with a soft Leather.

Fig. 3. Shews you the two Parts together. AB, is the Curvature; C the Notches; D the Place where the Fulcrum is joined to the Lever; EDE, the longer Branch; F the wooden Handle; GG the two Legs, on which the Fulcrum rests.

Fig. 4. Represents another larger Fulcrum, which he advises to use in more violent Fractures, where the other is too small to answer the Intention. A is the Screw, and BCB, the Arch, as in the other, *Fig. 2.* DD. And here both Ends are perforated with small Holes, that the Pillows underneath may be fixed more commodiously on each Side with a Needle and Thread. But here we must observe, that PETIT prefers his own Lever to all others that were invented by his Predecessors, and makes not the least mention of that antient and excellent Lever of HILDANUS, delineated by him *Obs. 4. Cent. III.* and which I recommended and delineated also with Improvements above thirty Years ago: whereas this is full as useful, if not preferable to his. He moreover finds fault with the three-footed Lever, that it is of no Use, where there is no Aperture, or but a small one in the Fracture; and therefore prefers his own. But he has not shewn us, nor indeed can I discover, how his Lever, which is none of the smallest, can be introduced in a small Aperture. But HILDANUS's and mine may be used, where there is no Aperture, as they are furnished with a Trepan; and therefore are by no Means inferior to his.

Fig. 5. Represents a very peculiar Method in which a Woman's Arm was cut off by my Direction, that had been burnt quite to the Breast, and even to the Bones.



Bones. A B shews the right Arm burnt quite up to the Neck and the upper Part of the Breast, (C C) that all the Skin, and the greatest of the Muscles of the Arm were consumed to the Bones. Hence it was to be amputated just under the Joint, and where the Tournequet is usually applied to stop the Hæmorrhage; but which for very weighty Reasons could not be applied here. We therefore begun our Treatment of this Case with passing a large crooked Needle with a strong double Thread (D) through the Muscles that had lost their Integuments, just below the Head of the *Os humeri*; which Thread was there fastened, to make a strong Ligature on the brachial Vessels and the remaining Flesh. Then, a little below the Place marked B and D, the Flesh was cut off with a Scalpel quite to the Bone, without any considerable Hæmorrhage. The Flesh thus removed, the Bone was sawed off after the usual Practice; and but a small Efflux of Blood ensued on the Operation, which was owing to the Ligature before made on the Artery. The Dressing was performed in the same Manner, as in Amputations of the Arm at the Joint; and the Cure succeeded happily. My Friend ELIAS FREDERIC, who conducted this Operation, has given a full Account of the Case, with the Advantages that may come from this new Method of amputating, in a separate Tract of his published at *Helmstadt*, An. Dom. 1739.

Fig. 6 and 7. Represent another new Machine invented by PETIT for stopping the Blood in the Amputation of the Thigh, without using any sharp Medicines, Caustery, or Ligature of the Vessels. This is compounded as it were of two smaller Machines: one of which serves to compress the Trunk of the crural Artery, near the Groin, especially in the very Act of Amputation; the other, to perform the same on the same Artery, above the Knee, after the Operation. The first and superior Part of this Machine is applied to the Body, by way of Tournequet, before the Amputation, to prevent an Hæmorrhage in the Artery during the Operation. AAA is the circular Bandage which goes round the Abdomen, like the Bandage, *ad Hernias*, and is fastened at the Side by two Strings and Hasps, as in Fig. 7. E E. (This is not mentioned by the Author, but it appears to me to be the Method; nor does he inform us of what Stuff the Bandage should be made; which may be either Leather or Callico.)

B B, Another circular Bandage, is drawn round the upper Part of the Thigh, just below the Groin, and fastened with Strings and Hasps like the former: where to one End of the Bandage are affixed two iron Plates (C, D,) covered with a soft Leather. The undermost Plate is plain, where it is in Contact with the upper and exterior; but where it touches the *Plica Inguinalis*, it is furnished with a hard well-stuffed Pillow. The Middle of this Pillow (c, Fig. 6.) is placed with great Accuracy on the Trunk of the crural Artery, where it passes from the Abdomen into the Femur: the exterior Plate is joined to both Bandages, and serves for a fixed Point, while they are connected to each other by Tapes or some such Ligaments. See Fig. 7. K. The Bandage on the Loins hinders it from falling down, and that on the Thigh from sliding up; they both together sustain it in such a Manner, that the Plate and Pillow C are kept fixed and immovable. E shews the Trochlea Fig. 7. which passes through the Screw-hole of the upper Plate to the Middle of the lower.

lower ; which if you turn to the right, the two Plates recede from each other ; if to the left, they are drawn together. But whether they are drawn to or from each other, to keep them always parallel in a right Line, there are two small steel Cylinders (N^o 1. and 2.) affixed in the lower Plate, which are raised perpendicularly, and pass through corresponding Apertures in the exterior Plate, one on the right Side of the Trochlea E, and the other on the left.

In the Application therefore of this Machine, when the Trochlea is turned to the right, these Plates recede from each other. But, as the two Girts or Bandages confine the upper Plate and resist its rising, the under-one with its hard Pillow must necessarily be forced inwards to the *Plica Inguinalis*, and so compress the *crural* (or *femoral*) Artery more or less, in Proportion as you wind the Trochlea ; that at last no more Blood can pass through it to the Knee.

Thus far this Part of the Machine has performed its Office during the Operation.

But, to restrain the Bleeding after the Artery has been divided, our Author has contrived another, which consists (much like the former) of two iron Plates. For from the upper and larger Girt round the Loins, there descend four narrower Strips, which are strongly supported by the two circular Bandages of the former Part. But, before these Slips are fastened at their other End, a Pellet of Lint is applied to the divided Artery sufficient to compress it ; not directly against the Wound of the Artery, but on one Side of it, and that the Inside of the Thigh, at the greatest Distance from it Bone : that so, when it is pressed against the *Os femoris*, the Sides of the open Artery may be closely constricted. Over this Lint-pellet you must place another, somewhat larger ; and on that a third, or fourth, if there be Occasion, each still larger than the preceding ; all of them pressed against the Thigh bone, in the same Direction, as above. Then the Center of the Plate furnished with the hard Pillow (*Fig. 6. G.*) is applied to the last Pellet, and fastened by the four descending Strips F F F F, which are all fixed in the H^{asps} of the exterior Plate H. If then the Trochlea H, *Fig. 6.* be turned to the right, the Plates will recede from each other. But, as the four descending Strips restrain the exterior Plate from giving way downwards, the interior, or that next the Wound, is forced toward the Wound, and, the Lint-pellets ; which there concur with joint Forces to compress the Artery in such a Manner, as to prevent an Hæmorrhage.

This lower Part of the Machine being thus properly applied, the Trochlea E, *Fig. 7.* should be a little relaxed, till the ^a Pulse of the Artery is just perceptible : but if the Pulse be strong, it is a plain Indication that the Blood runs too freely into the Artery ; the Trochlea therefore must be again wound up, a Turn or two, till it appear from the Pulse being moderated, that the Influx of the Blood is greatly diminished. So the first Part of the Machine not only restrains the Hæmorrhage powerfully during the Amputation, but when it is over, serves also to moderate the Influx of the Blood into the incised Artery : and the latter compressing the Artery checks the Efflux through

^a But our Author does not inform us, how we shall perceive the Pulse of this femoral Artery, nor can I possibly guess ; especially as the Thigh is so surrounded with the Apparatus, and the Artery covered partly with steel Plates and partly with Leather, which can scarce be perceived in the naked Thigh, when in Health and Vigour.

the Wound, and at the same Time promotes its healing. — As soon as a Suppuration is formed, he assures us that the whole Apparatus may safely be removed at every Dressing, without any Danger of an Hæmorrhage: which is far from being the Case in the other Methods of Practice. He moreover declares, that by the Assistance of this Machine, there is no fear of a Bleeding, even at the first Dressing, if the superior Trochlea E be wound up a little. And he affirms that, by Degrees, the Trochlea may be relaxed more and more at every fresh Dressing, only changing the Lint Pellets, if there be Occasion; and that by this Method the Wound would be effectually healed and consolidated. The Author declaims still more largely on the Excellencies of this Machine; for which I refer you to his *Amsterdam* Edition, p. 138 & *seq.* But in many Places, as I have observed before, he is too concise, and consequently obscure, though otherwise a very learned and ingenious Writer.

In *Fig. 8.* AAAA Exhibit a particular Machine or kind of Fillet, which I have frequently used in curing obstinate Hare-lips: which Fillet it applied to the Infant's Head before we enter upon the Incision, and by means of the Tapes CC, wound about the Head and tied with the Knot D, is well secured and fastened at the Forehead. Then the Cutting and Suture is performed in the Manner we before advised, Chap. LXXIV. But more effectually to conjoin such Hare-lips as have a very large Aperture, I have added to these Fillets near the upper Lip of each Side a Process of a proper Size (BB, BB,) furnished each with two Hooks: through one of which upper Hooks (after having applied externally to the Wound Honey of Roses or some vulnerary Balsam) I pass a strong silk Thread; which I then draw to the opposite Side, and constringe the Lips firmly. From thence I return to the former, and repeat it two or three Times; I then descend to the lower Hooks, and do the same there; carefully observing that the Lips be drawn close. And having left the Threads there for four or five Days, I cut them with a Pair of Scissars: but I still leave the Needles with their Threads; one of which I cautiously extract the next Day, and in a Day or two the other. If there are three, the third is likewise extracted the Day after. And, lastly, I apply a healing Plaster for some Days, till the Wound is consolidated.

In the same Figure it represented the Method of treating the *Fistula lacrymalis*: which he mentions, as entirely new, and preferable to all other Methods. The Cause of it he allows, with ANELLIUS and myself, to be an Obstruction of the Nasal Duct, though he suppresses our Names. He then goes on in proposing the Cure: “ To open the obstructed Duct, I only make an Incision in the lacrymal Sack (which he delineates in the same Manner as “ I have *Fig. 8. E, F,*) I then introduce (says he) a grooved Probe, and “ protrude it into the Nose, (the same as mine G,) and thus I open the “ Duct: I pass afterwards a Wax-candle (*une Bougie*) through the Aperture “ I had made, and by this Means keep it open. This *Bougie* I change every “ Day, and leave it off, when I find the internal Surface of the new Passage “ healed. Thus the Tears through this Duct easily recover their natural “ Course from the Eye to the Nose, and the external Wound heals in two or “ three Days.”

Here again our Author is more strangely obscure and defective. For, first, he has been very deficient in the Description of his Probe: The Conformation of which it is necessary to know, if we would profit by his Account, and particularly the Size of the Probe itself, and of its Point; which if too fine, would be insufficient to perforate the Duct when strongly concreted; if too thick, could by no means be introduced. Nor (2.) can the Size of the Groove for passing the *Bougie* be discovered from his Figure, being concealed in the Duct: for if it is not larger within than as he has delineated it near the lacrymal Sack, I cannot conceive how it should hold the Candle, as it will hardly admit even a Hog's Bristle. Nor (3.) does he mention the Thickness of his *Bougie*: nor indeed what his Probe is made of, whether Silver or Steel, &c. for if of Silver, and so fine, as it is delineated at the lacrymal Sack, it is much too weak to perforate the Duct, and of Consequence liable to be bent in the Operation. And (4.) he has not told us, how long the new Aperture is to be kept open and the Candle retained in it, nor what Medicines applied to promote and perfect the Cure; which is rarely effected under a long Time, as I have too often experienced. For I have myself, for thirty Years and upwards, been concerned in the Cure of lacrymal Fistulæ, and those not of the most malignant; which I treated much in the preceding Manner, but with a solid Probe (as Plate I. K.) I then introduce a *Bougie*, about the Bigness of a moderate Straw, or a leaden Pin of the same Size, and retained them in the Duct for many Days, and sometimes many Weeks: but it was generally a long Time ere I could keep it open. Nay, in some Cases, I could not effect it by any Means; neither by Candles, nor Tents, nor the leaden Probe: for after keeping it open even for Months, upon healing the external Wound this new perforated Duct grew together again but a few Days after. So far is that Assertion of PETIT's from being generally true, which he so roundly delivers: "That there was Nothing to be done, but just to open the Duct with a Probe, and the Tears would very soon, and with great Ease, recover their natural Course from the Eyes to the Nose." A bold Assertion this; and which, if credited, will often deceive both the Practitioner and Patient, as I am well assured from repeated Experience.

Fig. 9. Demonstrates the Method of curing Hernias of the Intestines without Castration; which indeed I have described long since in my Surgery: but as VOGELIUS, a famous Surgeon at *Lubeck*, has illustrated this Method with a Plate, I have borrowed it from him.

a points out the Situation of the abdominal Ring, through which, in Hernias, the Intestines with their Sack prolapse into the Scrotum; *b b* the Integuments laid open, to discover the Hernious Sack, and particularly its upper Part, on which the Ligature is to be made; *c c* the Scrotum opened to shew the lower Part of the Sack, and the Testicle beneath.

d the Sack itself fallen quite into the Scrotum, in which are contained the prolapsed Intestines or *Omentum*, or both; which takes its Rise from the inferior Lamina of the Peritonæum protruded through the abdominal Ring; *e* the Testicle, and a little above, *f* its spermatic Vessels; *g g* the String by which the Ligature is made upon the Sack, the Intestines and *Omentum* being returned.

I.

Fig.

Fig. 10. Exhibits the *English Forceps*, for extracting out of the Uterus the Fœtus when wedged in by the Head; the Hint of which Invention was taken from PALFINUS's Hooks, first described and delineated by me, Plate XXXIII.

Fig. 16.

AA are the two Hooks or Cheeks; C the Joint which connects them, and where I disjoin them on their Application. Thus they are to be introduced one after another on each Side of the Infant's Head; then joining them again, you take fast hold of the Head, and extract the Fœtus. With one Part of these Forceps I turned the Head of a Fœtus into its natural Situation, which had been inclined to one Side, and had stuck so two Days in a difficult Birth; and by this Means extracted it alive. If you use one Side of them in an inverted Manner, A may serve for the Hook left in the dead Fœtus, and B for the Handle.

An EXPLANATION of the FORTIETH PLATE.

This Plate is taken from a Treatise of the famous SCHLICHTINGIUS of *Amsterdam*, where he has described an Instrument, with which the celebrated ROONHUYNS delivered many Women with Success in difficult Births. He assures us that the *Os Uteri* and *Uterus* itself is dilated more speedily and with less Pain by this Instrument than any other, and the Fœtus thereby quicker and easier extracted.

Fig. 1. Is the Instrument. AAAAAA are its two steel elastic Laminæ, near two Spans long, one Finger broad, and about half a Line in Thickness. One of these Laminæ, and that the lowest and largest DD is strait and somewhat thicker than the other: Which (marked BB and FF) is thinner, curve and luniform; that, with the concave Part, it may be accommodated to the internal Sides of the *Uterus*, and the convex to the Fœtus just as the Circle is more or less compressed or distended.

BB two Hemicycles, or oval Arches, elastic, and opposite to each other, for the more commodious Extraction of the incuneated Fœtus.

C the Ginglymus Connection by which the lower Parts of the Laminæ are joined together, by Means of a cylindrical Pipe for the Extraction of the Infant.

DDDD the Thickness of the Plates both in the upper incurvated and the lower strait Parts.

E the Pin which enters the Cavity of the Cylinder C, to connect the two Plates by Way of Ginglymus. This Pin may be made either of Steel or Wood.

FF their external Sides; GG internal.

HH shew the Place, where one or more Fingers may be introduced occasionally between the two Plates to separate them more or less from each other; which, when removed, they are easily closed.

II the Space, in which the Head of the Fœtus or any other round Part may be retained between the Laminæ.

Fig. 2. Represents the same Instrument, with the Plates asunder, the Joint Ginglymus AA being loosed; where one Plate is conducted over the other (BC) by the Fore-finger of the left Hand D, through the *Os Uteri* E, into the *Uterus* itself.

itself. F the Middle-finger of the Left-hand. G the Thumb-knuckle of the same.

H H H the Holes, by which the Covering (either of Leather or Callico) is fastened to the Plates, to keep it tight in the Extraction of the Instrument.

Fig. 3. Exhibits Twins in an oblique-figured Womb; which, the Waters being broke, is excessively contracted, and confines the Fœtus in a perverse Situation. SCHLICHTINGIUS tells us that this Figure was never before delineated accurately; and that this is one of the most difficult Cases in the whole Art of Midwifery.

By *a a a a a* is represented the oblique and male-figured Uterus, where there are Twins perversely situated, and wedged in by the Contraction of the Uterus, whose oval Shape is destroyed and rendered uneven by its gibbous Prominences.

b b shew the external *Os Uteri*, a little distended by ROONHUY'S Instrument.

c c are the Curve-ends of this Instrument round the incuneated Twins, where they are passed between the *Uterus* and Fœtus.

d d are the strait Parts of the Instrument, which appear out of the Uterus, and are somewhat opened.

e e the Twins in their unnatural Situation, squeezed as it were in a Heap; one of which is represented a little larger than the other.

f f two *Placentæ Uteri*; *g* a Hand of one of the Infants protruded through the Vagina; *h* one of the Navel-strings hanging out of the *Uterus*.



A N

I N D E X

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